

The fishes obtained by the United States
Exploring Expedition, 1838 to 1842 under the command of
Captain Charles Wilkes.

By

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and

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Introduction.

Seldom has a collection of fishes, of such extent as that gathered by the United States Exploring Expedition, reposed in seclusion for so long a time without attracting the attention of some investigator. Over eight decades have now passed since most of these fishes were gathered together. As the majority appear to have passed down to our time in a fair condition of preservation in alcohol, it is quite evident that they have received the necessary attention. A small number were without data and some labels had been mixed, but many of these we have been able to rectify through data gleaned from the original drawings and sketches along with the field numbers. While various contributions to Ichthyology, some of them quite pertinent to regions traversed by the Expedition, have appeared in one form or another, no one appears to have considered it worth while to look over and compare these old specimens and work out their determinations. Upon the recommendation of Mr. Bean, in charge of the Division of Fishes, U. S. National Museum, our request that the material

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be sent to Philadelphia, and there studied in connection with some of the older collections of fishes in the Academy of Natural Sciences, was approved by the officials of the Museum. Especial interest was attached to a comparison with the Hawaiian material gathered shortly after the Exploring Expedition's visits by Townsend and Nuttall. An interesting historical retrospect is also here afforded, as the Academy of Natural Sciences of Philadelphia was solicited to nominate the scientific staff, which afterwards rendered such excellent returns.

Although the initiation of such an effort as a United States Exploring Expedition called for prodigies of daring and labor in many fields, the obstacles doubtless appearing unsurmountable, one may now readily see its final accomplishments as the measure of its success. Well may we wonder that there ever was a United States Exploring Expedition, for even at the present time it is extremely doubtful if any such voyage could be solicited for such purposes as the ingenious and intrepid Wilkes devised. It is not our purpose to dwell on the glories of this truly great undertaking, though may we ever cherish admiration for the gallant Commander and his faithful men for the luster they have added to the American flag. The discovery of the Antarctic Continent was, of course, not among the least of the many achievements, as the numerous volumes relating to the expedition attest. It is, therefore, as a contribution to science that the present notes and studies are offered, as well as to com-

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plete so far as we are able at this late time, the report on the fishes already promised by Wilkes himself in his narrative of the expedition.

It is necessary, in order to secure a proper appreciation of the extent and value of the materials gathered in the department of ichthyology, to try and view the efforts of the indefatigable Wilkes at the time of their consummation. During that early period of the nineteenth Century comparatively few voyages of exploration in the southern hemisphere had been completed when Wilkes embarked. In 1824 Quoy and Gaimard reported the fishes obtained by the voyage of Freycinet; 1826 to 1830, Lesson, in Duperry's Voyage of the Coquille; 1834, Quoy and Gaimard in the Voyage of the Astrolabe under Dumont d Urville; 1836 and 1837, Eydoux and Souleyet, in the Voyage of La Bonite, though the ichthyological portion appeared in 1841. If one glances at the results of these various works, it is quite evident that they fall very far short of the richness and variety in comparison with the collections and work of the United States Exploring Expedition.

x The localities which have at last come down to us, and are preserved along with the specimens, may be briefly considered. In the Atlantic we find the Cape Verde Islands, Rio Janeiro, northern Patagonia, Orange Harbor in Tierra del Fuego and the Cape of Good Hope. Of this group the Rio Janeiro material is fairly extensive, and far more complete than Agassiz's report of the Spix collection in 1829. Most of the

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materials

Orange Harbor, remained unique, until quite recently supplanted by various other investigators.

× Along the western coast of South America collections were made in Chili, especially at Valparaiso and Peru, and some at Callao, and like the Patagonian and Tierra del Fuego material equally extensive as the Beagle collections reported by Jenyns in 1842.

× By far the most complete collection was made in the Hawaiian Islands, and remained so until the recent collections made by the United States Bureau of Fisheries and others. A very important lot of material was secured in the Fiji group, and this remains, even at the present time, largely unsurpassed. Other localities in the tropical Pacific are Samoa, Pomotou, Tahiti, Tongatabu, Raraka, the Phoenix Coral Group, Mangsi Island, Wakes Island and Mauda. The expedition visited the western coast of the United States at Puget Sound, the Columbia River and San Francisco. Several of the fishes obtained in this lot were subsequently studied by Agassiz.

× Finally an interesting lot of material was secured in Australia, the only definite localities appearing to be Sydney. Other material was obtained in New Zealand, Singapore, Balabac Passage, Manila, and several specimens are also credited to Colombo, in Ceylon.

× At present many of the specimens are in excellent condition, compared with others of equal age elsewhere. Some have suffered more or less through the vicissitudes of time and others, in a poor state of preservation, have still persisted with broken bodies, abraded or worn fins, fallen

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scales, etc. Quite likely some of this may have been due to their condition when secured, as staleness, etc. From the figures in detail, made later, it is evident a small ^{part} portion of the specimens are not now extant. We have in these cases always indicated that our identification is from the original drawing. Though we have no information now, very likely numbers of specimens were obtained of a given species, and only a selection or a few of the apparent desiderata preserved.

~~A few interesting items, gleaned from Wilkes interesting narrative in five volumes, and pertinent to the present report follow. The expedition departed August 17, 1838, passing beyond Cape Henry the next day. During the novelty of the first days out Wilkes says "it was amusing to see all entering into the novel occupation of dissecting the fish taken, and to hear scientific names bandied about between Jack and his shipmates." September 6, a large cotton-wood trunk was met with. "Great quantities of fish were about it, consisting of dolphins, sharks, &c. We did not, however, succeed in taking any." At Madeira "sea fish are abundant; but not a single trace of a fresh water fish was seen or found in the streams." At Porto Praya, Cape de Verde, "the seine was drawn for fish in one of the coves to the eastward of the anchorage, in what we understood was a place well adapted for the purpose, but it did not prove so. I should prefer the western beach, as offering better luck and being more advantageous."~~

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Route of the Expedition.

pectorals.

25. Passage from New Zealand to Toga-
tabu. Sailed in Vincennes April 6th.

April 19th. S. Lat. $26^{\circ} 7'$. Flying fish
came on board. Perhaps same as Rosa
Island specimens.

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A few interesting items, gleaned from Wilkes' narrative in five volumes, and pertinent to the present report follow in quotations. To these we also add various others from the mss. of ^{Dr.} Charles Pickens' rough notes, note books and journal, transcribed in June 1849. We have freely altered them as the occasion demands, though keeping each in the original sequence of their captions. The expedition departed August 17, 1838, passing beyond Cape Henry the next day. During the novelty of the first days Jout Wilkes says "it was amusing to see all entering into the novel occupation of dissecting the fish taken and to hear scientific names bandied about between Jack and his shipmates."

1. Passage from United States to Madeira.
Arrived September 16th.

August 24th [sixth day after leaving Chesapeake]. Some dolphins (Coryphaena) were taken. A small Carran taken by net; also 3 other small fish from stomachs of Coryphaena (Zeus?, Aluterus, etc.).

"September 6th, a large cotton-wood trunk was met with. Great quantities of fish were about it, consisting of dolphins, sharks, &c. We did not, however, succeed in taking any."

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2. Passage from Madeira to the Cape Verde Islands.

September 30th. Examined two specimens of a flying fish (Exocoetidae).

October 1st. Flying fish exceedingly numerous yesterday and today. Sometimes a shoal of them would rise, roughing the water for an acre in extent. Three came aboard one of our vessels and more than 50 on one of the schooners. We had often previously observed them darting over the water for at least 100 yards, and by no means dependent on the first impetus. They might easily and indeed were sometimes mistaken for birds.

October 2nd. A larger species of flying fish was sent on board by Mr. Reed (commanding U. S. Schooner Sea Gull). Total length 15 inches. Dorsal rays 13, anal 10. [From the rather detailed comments we judge this is Cypselurus bahiensis (Ranzani).]

At Madeira "sea fish are abundant; but not a single trace of a fresh water fish was seen or found in the streams."

3. Cape Verde Islands. Arrived October 6th.

Muraena. Fishes in great variety. We did not meet with Balistidae.

At Porto Praya "the seine was drawn for fish in one of the coves to the eastward of the anchorage, in what we understood was a place well adapted for the purpose, but it did not prove so. I should prefer the western beach, as offering better luck and being more advantageous."

4. Passage from Cape Verde Islands to Rio Janeiro. Left the same evening. November 2nd. No flying fish seen for a fortnight past.

October 27th. N. Lat. $40^{\circ} 7'$ W. Long. $20^{\circ} 43'$. The wind being very light, Porpita, young fry of flying fish were taken by Mr. Craven in net.

November 4th, Sunday. Weather fine. A flying fish seen to day.

November 6th. N. Lat. $0^{\circ} 35'$ W. Long. $17^{\circ} 37'$. Two or three shoals of flying fish were observed.

November 11th. A *Thynnus* taken, its stomach containing a flying fish (*Exocoetus volitans* Cuvier).

November 14th. S. Lat. $8^{\circ} 56''$ W. Long. 24° . Observed a flying fish alter its course 2 or 3 times while in the air.

November 18th, Sunday. Several large flying fish seen this morning (probably the large species obtained October 2nd).

5. Rio Janeiro. Arrived November 23rd.

Atherine? figured by Mr. Drayton as having a single dorsal. Having all the habits of a minnow. Common in shallow water in sandy parts of Bay and brackish lagoons (as Petenitga). Motions rapid, like smelt or minnow. [This is Thyrina brasiliensis (Valenciennes).]

Belline almeida Droy and Gaimard? In same situations and as if following the bounds of the preceding fish. [This is Strongylura timore (Walbaum).]

Hemicampus. Common, in market. Cingilla or Sphagebranchus. A small species with small mouth. Occasionally, seen in market.

Muraena melanotis Droy and Gaimard, ^{Plate 52} occasionally seen in market and one taken in fish in the Bay.

Muraena. One or two large species seen in market, rare, one green. Muraena. Others, with blackish speckles.

Hippocampus. Not uncommon. Syngnathus. A small species, occasionally seen among the Penaeus (shrimps brought to market).

Diodon. Occasionally seen dead along the shores of the Bay.

Tetodon. Three or four species. Often

seen about the rocky shores of the Bay
and easily captured by hand net. Small
Tetrodon. A fine oblong smooth species,
perhaps a foot in length. Found dead
along shores of Bay.

Squalistes. One living. Seen in market.
Macacanthus. Not uncommon.

Ostracion. With two horns. Thrice seen.

6. Passage from Rio Janeiro to North
Patagonia. Left January 7th 1839.

No Exocoetus observed.

7. Mouth of the Rio Negro, North

Patagonia. Arrived January 25th.

No fishes belonging to the above
families obtained at this place.

8. Passage from Rio Negro to Terra del
Fuego. Left February 2nd.

No flying fish observed.

9. Drake Harbor. Arrived February 18th.

Galaxias. Two inches long. No visible scales.

Only one dorsal opposite to the anal.
Ventrals very far back. Vent just
anterior to anal. In fresh-water
lakes, taken with hook by Mr. Drayton
(after the departure of the Relief. These
lakes among the hills were small,
hardly more than acre in extent and
I did not, while viewing them suspect
that they contained fish) as they varied

the bait with such pertinacity that they were drawn out by it.

Syngnathus. A caudal fin, pectorals, a dorsal. The anal was not made out, as specimen dried before immersion. Orange Harbor. Mr. Dyer.

10. Passage from Orange Harbor to Valparaiso. Sailed in the Relief, February 27th. No flying fish.

11. Valparaiso. Arrived April 15th.

Scombrex. One to $1\frac{1}{2}$ feet long. Market. linguilla. Yellow and brown. Row of white dots, half an inch apart - in lateral line. Pectorals whitish. Market.

Syngnathus. Nine inches. Body deep, compressed, $\frac{2}{3}$ an inch deep, thinner in back. Caudal fin ovate, rounded. Alb. tinned in market by Mr. Duma.

12. Passage from Valparaiso to Callao.

Sailed in the Relief, May 1st.

May 6th. S. Lat. $21^{\circ}5'$. Flying fish (Exocoetetes) seen this morning by Mr. Rich.

13. Callao, Peru. Arrived May 12th.

Belone. Two feet, depressed, tail carinate each side. A silver stripe on flanks. Callao market.

linguilla. Like Chilean. A row of distinct white spots on each flank. Mouth rather large and teeth inclining backwards. Twelve to sixteen inches.

At San Lorenzo, Peru "the waters abound with excellent fish" and near Casa Cancha "in the streams that flowed near it, were fish from six to eight inches in length, but none of these were taken".

14. Passage from Callao to Coral Archipelago: Sailed in Vincennes, July 13th.

July 18th. First fine clear day we have had for a long time. Flying fish seen today by Mr. Couthoury.

July 19th. S. Lat. $13^{\circ}38'$ W. Long. $89^{\circ}24'$.

July 20th or 21st, Sunday. Flying fish seen. First day that felt rather warm.

July 24th. S. Lat. $15^{\circ}35'$. Flying fish abundant for several days past.

15. Coral Archipelago. Arrived

August 13th.

Aliodon. A foot long, sent on board by Lieut. Pinkney (commanding the U.S. Schooner Flying fish) picked up dead August 13th (in the morning of the day we made the land - Island of Clermont Tonnere. S. Lat. $18^{\circ}28'$, W. Long. $136^{\circ}43'$).

Exocoetis. One seen near the shore of Clermont Tonnere.

Balistes. Several specimens of a richly colored Balistes were taken by the hook, all of the same size, deep blue with fine zig-zag lines of black (an outline of the colors taken by Mr.

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Drayton). Clermont Innere. At Hounden
Island this same species seemed the
most abundant fish near the shore
and many specimens were taken with
the hook.

Muraena. Ground color pale, thickly
sprinkled with slate-colored dots. It
grows to the length of two feet or
more. Conceals itself in the holes,
coiled up in cup-like cavities V-shaped
of the coral shelf, with its head at
the entrance, always ready for an
attack and its bite is very severe.
Not troublesome unless molested.
Gill openings very small. No pectorals.
Hounden Island.

Exocoetus. Seemed common at the
disappointment Islands.

Ophichthys. Entirely destitute of
any visible fins and more elongate
than the Muraena. Ground color
white, with large brown spots all
over, almost confluent. Under stones,
at inner margin of coral shelf.
Common. Parakea. August 30th.

Muraena. Resembles the preceding
Ophichthys in color, except a green line
along the top of the dorsal. Fins dis-
tinguishable. Under stones with the preceding,
but burrows so quickly among the coral

and other debris that all those seen, escaped.
Raraka.

Tetrodon. Ground color dark, with white spots all over, when inflated seen to be covered with blunt villi. About stones on the coral shelf in the shallow water. Figure by Mr. Drayton. Largest specimen 9 inches. Raraka.

Aluterus. Length 18 inches. Very much compressed. Caudal fin very large. Dorsal spine very short. Sketch by Mr. Drayton. Taken in pens by the natives, together with a large Scarus. Captain Wilkes. Raraka.

Balistes. Length 2 feet and depth 10 inches. Thick lips and teeth very strong, projecting forwards. Rows of prominentes on each side of tail, but no spines. Tail squarish. Destitute of any brilliant colors and general tint brown. An ochrey patch on side of head. Central part of fins pale or dirty flesh color. Taken in pens by the natives. Captain Wilkes. Raraka.

No Osteichthys yet seen in Coral Archipelago.

Tetrodon. Same as at Raraka. Figured. Carlschoff's Island. September 3rd.

Balistes. Near B. prasinus in Duoy and Taimara, Voy. Freycinet. One mental

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ventral, thick lips and elongated snout.
Teeth inclining forwards, with one
projecting angle. First dorsal with 3
spines. Three rows of spines pointing
forwards on each side of tail. Length
about 8 inches. Three specimens, all
of same size, obtained by Captain
Wilkes. Figure by Drayton. Red spot
at base of pectoral. Carlshoff Island.

Tetrodon. Same as Raraka species.
Wilson's Island, September 6th.

Balister. Precisely size and shape of
last Balister, but differ in pattern of
colors, etc., which invariable in 3
specimens. Concealed in holes in the
coral shelf ledge and also under stones.
Wilson's Island.

Muraena. Common at Wilson's Island,
September 6th. Like first Muraena from
the Coral Archipelago.

Ophichthus. Same as Raraka specimen,
one example. Peacock Island. September 7th.

Muraena. Same as Horden Island
specimen. Peacock Island.

Balister. Several specimens about stones,
coral blocks, in coral shelf, unvarying
in size and disposition of colors. Peacock
Island.

Tetrodon. Apparently same as Raraka
example, but much larger. Perhaps $1\frac{1}{2}$
feet long, probably very old. Colors lighter.

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tentacle over nostril. Taken in the lagoon
in shallow water. Peacock Island.

Diodon or Tetrodon. One started from
under the bows of the vessel, while coast-
ing along Devi's Island. September 8th,
Sunday.

Exocoetus. The red-finned, pretty
common. September 8th.

Exocoetus. Size intermediate between the
two Atlantic species. Pectorals above of a
dull reddish purple. A basket full seen,
taken in nets. Eaten raw by the natives,
at the same time that the Bithynus crab
and sweet potatoes were baked with
hot stones. Metia or Aurora Island,
an elevated coral island, about 12
hours sail from Tahiti. September 9th.

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At San Lorenzo, Peru, "the waters abound with excellent fish" and near Casa Cancha "in the streams that flowed near it, were fish of from six to eight inches in length, but none of these were taken. "In the Paumotu Group "the various snakes, the many-coloured fish, the great eels, enormous and voracious sharks, shells, large molluscs, spiders, with the curious lepidoptera, seemed to have quite^e possession, their webs stretching in every direction, and occasioning us much annoyance: all gave a novelty to the scene, that highly interested and delighted us." At the entrance to the lagoon of Raraka "the way of catching fish here is quite amusing, and to it we owe the many specimens in that department of natural history which we obtained. The natives enjoy the sport amazingly, and both old and young are all in some way participators in it. Near the mouth of the lagoon are laid some coral stones, forming a rude and shallow pen, with a channel leading to it; several natives proceed about one-third of a mile up the beach of the lagoon, where they enter the water, ranging themselves in a row, tallest in the deepest water. They then move along down toward the pen, quite noiselessly at first, driving the fish before them. As they approach they begin to splash and make a noise; the clamour gradually increases, untill it became one continued shout. they then contract themselves towards the pen, and the fish are seen jumping and dashing in all directions, as if very much alarmed, until they are forced to enter the pen, which

is then closed with a few stones; afterwards the natives begin to spear them with great dexterity, and many were obtained. It was gratifying to witness the pleasure that both old and young appeared to take in this employment, and quite surprising that the fish do not escape over the low wall that surrounds them, only two or three inches above the water; but they appear bewildered." He says of Tahiti "the small streams flowing through luxuriant woods, add much to its beauty; these run bubbling along to the sea, passing many cool and pleasant places: their entrances are usually closed up by the natives, for the purpose of taking fish, a sort of dam being constructed, over which the water flows, and the natives, standing on the outside up to their waists in water, are often seen taking the fish in baskets."

At San Pablo Island in the Paumotu Group, two large fish, evidently scaroids, were received from the natives, "the smaller of which measured five feet two inches in length, and its greatest circumference was four feet four inches. These proved to be excellent food. They were remarkable for their splendored colour, the great size of the canine teeth in each jaw, and a large protuberance over the eyes; the head was without scales, the body being covered with large circular plates, over which the epidermis was very thick and of a rich blue colour, with regular concentric stripes of yellowish white; the fins and tails were striped with straight lines of alternate blue and yellow; the lips were fleshy, and the jaws strong and bony.

16. Tahiti. Arrived September 10th.

Belone. Length $2\frac{1}{2}$ feet. Upper jaw a little shorter. Taken in the seine at Matavai.

Hemiramphus. One picked up on the beach.

Muraena. Like an elongated Muraena. Near Ophisurus alternans Gray and Günther. Transverse bands and intermediate spots. Elongated and very slender, might readily be mistaken for a Hyporhamphus. Obtained at Papeete some 15 miles from Tahiti and in sight, by Dr. Gilchrist.

Muraena or Ophisurus. Dark colored, mottled. Three young specimens sent by Mr. Dana.

Anguilla. Uniform brown. Grows to the length of 4 feet. It seems to be in part, owing to the humidity of the climate in the mountains, that this eel has become almost amphibious; following the streams to their very sources, often in places hardly accessible to man or where the water scarce appears (makes its appearance) at the surface. In such situations it conceals itself in crevices, under stones, etc. and seems always to be in good condition; though I am at a loss to imagine in what it feeds. On the 23rd of September on the face of a very dangerous mountain ridge, I in part witnessed the chase of eels. The whole process

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was described to me by our attendant as follows:

The native went to a slight basin situated at the foot of a precipice - and placing a large flat stone in the middle of this basin, bailed out a portion of the water with his hands. The eel, on being disturbed in its place of concealment, immediately, as was anticipated, took refuge under this stone. The native then, cautiously inserting his hand, suddenly grasped the eel and threw it 30 or 40 feet into the woods, and at once gave chase.

Anguilla. A second variegated species was seen lower down in a fresh water stream, by Mr. Conthony.

Fieraffer. Parasite of globular Asterias, according to Conthony. Found at Samoa.

Hippocampus. Seen at one of the native houses, dried.

Homalanthus. Nine inches. Four spines each side of tail. Seized by a native. Apparently the young of this, with a second very short spine, sent by Mr. Dana.

Ostracion cornutus. Two horns in front and 2 behind. Purchased from a native by Captain Wilkes.

Ostracion. Without horns. Reefs. Dana gives following note. Back blackish brown,

minutely spotted with white. Sides
bluish, with yellow spots, surrounded
by a blackish ring. Vent bluish purple.
Stomach bluish brown, verging towards
purplish brown. Left Tahiti September 27.
17. Bellinghausen Island.

September 30th. A small coral island,
between Tahiti and Samoa. We here
recognized several of our old acquaint-
ances which we missed at Tahiti.
The shelf was in great part pretty
deeply overflowed, which perhaps was
one reason why we found large sized
fish upon it. The principal reason
probably, but the island is also un-
inhabited and unvisited by natives.

Exocoetidae. One vomited a young
gurnet (Sula).

Muraena. Common on the coral shelf.

Muraena. Four feet long and upwards.
A powerful fish, attacking often with-
out provocation. One of the men was
severely wounded while passing near
where one of these fish was concealed.
Figured by Mr. Drayton.

Balistidae. Common on the coral shelf.

18. Fishes from Bellinghausen Island
to Rosa Island.

October 4th. A small flying fish was
brought to me this morning by boy Roberts,
resembling the smaller Atlantic species.

19. Rosa Island, a coral islet, 12 hours sail east of Samoa. October 7th.

Exocoetus. Smaller than the red finned species and resembling the small Atlantic species. Back and top of the wings deep blue. Seems to replace the red finned species in this part of the Ocean and was first met with on October 4th. Appears to constitute the chief food of the gannets (Sula) - and was sometimes vomited entire by them.

Hemirhamphus. Young specimen, in the wood, brought by sea bird. Muraena. Swimming in the coral shelf and seemed disposed to make an attack.

20. Samoa or Navigator Islands. Arrived October 8th.

Hemirhamphus. Silvery stripe down side.

Hemirhamphus. Very thick. A series of 4 blackish spots each side. Taken in net at Upolu.

Belone. Same as Tahitian. Back blue, rest silvery. Several large specimens were taken by natives in drawing the "leaf cheese" at Hawaii. The natives state that this fish sometimes kills people by piercing them, probably run-

iving against them through accident, which I can easily conceive of. In the harbors at Tutuila I witnessed a singular gambol of one of these fish; it skimming along in an oblique position, entirely out of the water with the exception of the lower lobe of the caudal fin, with great swiftness, for at least a hundred yards.

Sieraffer. Same as Tahitian. Pale and sprinkled with dots. Apparently no ventrals. Harbor at Tutuila.

Lieut. North.

Muraena. Black, reticulated with white. Mouth large. Harbor at Tutuila.

Lieut. North.

Muraena. Blackish, with transverse white lines. Upolu. Drayton.

Muraenopsis. Differs from Tahitian. Broad, black, equidistant, regular rings, like elaps, without intermediate spots. Harbor at Tutuila.

Muraenopsis. Gill openings approximating. Every other band interrupted with sometimes forming 2 spots. Upolu. Drayton.

Balistes. Nine inches. Blackish. Three yellow lines extend from mouth under dorsal fin. Dorsal, anal and caudal yellow. Pectoral also, but black at base.

Balistes. Same as at Coral Islands.

Balistes. Three inches. Dark slate, with oblique reddish lines. Upolu. Drayton.

Muraenichthys. Length $2\frac{1}{2}$ inches. Compressed, snout projecting, hispid all over. Upolu. Drayton.

Tetrodon. Length $2\frac{1}{2}$ inches. Four T. ocellatus Bennett. Small, ornamented species. Green or blue spots and lines. Figure by Drayton. Upolu.

Syngnathus. Delicate, snout very slender. A caudal fin. Figure by Drayton. Upolu.

At Sapapale on Savaii Island, an interesting fishing was observed. "The net was a kind of cheval-de-frise, made of the leaves of the cocoanut tree, split and woven round a line, and was little less than half a mile in length. It was more formidable in appearance than in reality. This net was taken out at high water to the coral reef, in three pieces, then fastened together, and thus made to enclose a large extent of water. This space was gradually contracted by doubling up the net, which answered the same purpose as the drawing of a seine. The fish did not attempt to pass it, and were thus driven towards a certain point, where a sort of sack of matting had been placed for them to enter. As the fish were gradually enclosed by the mat, and the tide fell, the scene became an animated one. Men, women, and boys, to the number of two or three hundred, were eagerly engaged in

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picking up or catching the stragglers as they were seen leaping up; the whole area seemed alive with fish, jumping in every direction, some over the heads of the natives, and thus escaping, while others leaped into hand-nets. About a canoe load was caught, comprising thirty different kinds of fish, some of which were six or eight pounds in weight, but the majority were smaller." Later, in describing the war-like habits of the savages of western Upolu, he notes "Their spears were pointed with the sting of the ray-fish, which, on breaking off in the body, caused certain death."

21. Passage from Vamoa to Sydney.²⁷
Sailed November 10th.

November 12th. Flying fish were
seen off this (Wallis) Island.

November 24th, Sunday. Flying
fish seemed rather large, with ~~typical~~
parent wings.

November 25th. S. Lat. 33°.

22. Sydney, New South Wales. Arrived
November 26th.

Belone. Broad, depressed.

Hemiramphus. Called "guard fish"
at Sydney. Seen also at the head of
tide into the Hunter River, where
first learned the use of its singular
beak. Several were seen swimming
about, and gathering objects floating
on the surface; for which purpose the
long under jaw was now observed to
be an exceedingly convenient instrument,
passing beneath it directs the object
to the mouth, where it receives it
much more surely and without the
disturbance caused by the attempts of
ordinary fishes. The operation is
much the same as that of the Rhynchops
or scissor bill. The fish in fact skims
the surface from below as the bird
does from above.

Didon. "Porcupine fish," said to be in
Illawarra Lake. No specimens seen by
Drayton.

Tetrodon. Tortoise shell on pale ground.
Length 4 to 7 inches. Very common about
shores of harbors.

Tridacn. Balistidae. Not inflatable,
form compressed, very rough. Dorsal spine
barbed like siluroid. Seen near
shore in shallow water. Sydney
harbor.

Aluterus. Ten inches. Taken in net
by Mr. Dyer.

Aluterus. Apparently second species.
Length $3\frac{1}{2}$ inches. Dorsal spine barbed
both ends.

Of Lake Illawarra, on the coast close to the sea-beach
below Sydney, "contains a great quantity of fish, principal-
ly mullet." which were caught in large quantities, salted
and dried. The fishermen assured them there were thirteen
kinds of fish in the lake. At Lake Macquarie "as a part of
the lake was said to be fordable, it was determined to take
advantage of it, in order to shorten the route. One mounted
the horse to pass over. Whilst they were proceeding quietly
along, the horse suddenly reared and plunged, relieving him-
self of his rider and load, which were thrown into water two
feet deep, without any further injury than a good ducking,
and the disparagement of the wardrobe. It was found that the
horse had trodden upon a sting-ray, which fully accounted
for his sudden gambols." At the Auckland Islands "the rocks
are covered with limpets, and small fish of many varieties
are caught in quantities among the kelp."

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23. Passage from Sydney to New Zealand,
Sailed in merchant ship, February 8th
1840.

No flying fish observed.

24. New Zealand. Arrived February 24th
Hemiramphus. Leaped into the boat
at night in going down the Bay of Islands
where our party remained. Lieut-
enant Sinclair figured by Mr. Drayton

Galaxias. Form of a trout, but thicker.
Snout and dorsal opposite. Snout short,
obtusely. Branchiostegals 8. Length 7 inches.
Fresh waters. Brought by a native.

Galaxias. Second species smaller, but
more elongated. Swims in companies
near the surface, or in mid-water.
Taken with the hook in the stream
at the head of Waiacadi, an arm of the
Bay.

Unguilla. Fresh water. Grows to the
length of 4 or 5 feet. Taken in the streams,
and according to report also in the
Lake, mile or so in diameter and
about 18 miles from the Bay.

Unguilla. Second species. Taken in
the salt water in the middle of the
Bay. Larger head, mouth and eyes.
Under parts white. Very large branchi-
ostegal membrane. Iris golden. Length
 $2\frac{1}{2}$ feet. Dorsal commencing not far below

pectorals.

Syngnathus. Possibly 2 species. Banks's Peninsula on the Southern, or, as it is usually called, the Middle Island. Couthouy.

25. Passage from New Zealand to Tongatabu. Sailed in Vincennes, April 16th.

April 19th. S. Lat. $26^{\circ} 7'$. Flying fish. Came in board; perhaps some at Rosa Island species, but seemed smaller, with small ventrals. Figured by Drayton.

26. Tongatabu. Arrived April 24th.

Hemirhamphus. Same as No. 3 Samoa.

young.

Naturalia. Figured by Drayton.

Syngnathus. Small. Drayton. Same

as Fiji.

Malister. Same as Coral Islands

form. Figured by Drayton.

27. Passage from Tonga to Fiji Islands.

Sailed May 4th.

May 5th. A shoal of small flying fish.

28. Fiji Islands. Arrived amoy, May 6th.

Hemirhamphus. Like second Samoa species.

Three black spots towards tail. Drayton.

Tringilla? Black collar. Dorsal white margined. Coral shelf at Wandalewood Bay. About stones and often regardless

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of approach.

Conger? Large, ferocious. Jaws elongate.
Often taken with hooks along leeward
coast of the 2 large islands. Required
to be handled or even approached
cautiously.

Muraena. Vertical white bars.

Muraena. Black spotted.

Muraena. Uniform pale.

Muraena. Less spotted form of Hound

Island. Santa.

Muraena. Like Toga example. Drayton.

Muraena. Young, dotted. Ovale.

Muraena. Spotted. No pectorals. Taken

in stream at Liviska, Ovale, but
probably not truly fluviatile. Drayton.

Tringaster. Of Toga and Gaimard.

Like Samon. Parasite in globular Asterias.
Drayton.

Syngnathus. Like Toga species. Coral
shelf at Sandalwood Bay. Swimming
with body slightly curved, reminds me
of a small snake.

Diodon. Small. Obtained from natives
by Mr. Dyer, probably from outside the
reefs.

Petrodon. Two feet and more. Often
taken with hooks in leeward coast. Pale
gray above, with distant black dots.
Broad silver band inside. White below.

Tail deeply lunate, upper lobe longer.
 Eye very large. Pectoral quadrate, short.
 Dorsal and anal nearly opposite,
 singularly movable laterally. Under
 surface flange, forming an acute angle
 on carina. Some short filaments in
 venter. Apparently not much inflatable.
 Lips thick. Caught with small hook.
 Has the power of entirely closing or con-
 cealing the eye, apparently by means of
 a sphincter or orbicular muscle.

Tetrodon. Spotted and striped. An
 appendage to nostril.

Tetrodon. Like lineated of Tonga.

Young.

Tetrodon. Small. Spots on black ground.

Tetrodon. Venter pale, with black spots.

Tetrodon. Yellow. Back and patches

black purple. Drayton.

Tetrodon. Back very convex and mouth
 towards ventral surface. Drayton.

Tetrodon. Like Tetrodon, but apparently
 not inflatable. Blue spots and bright colors.
 Coral shelf, common.

Ostracion. Like Tahitian. Computed.
 Caudal very long. Perhaps this specimen
 secured by J. M. Hale in the leeward coast
 of Viti Levu.

Ostracion. Without horns. A light band
 between eyes. Drayton.

Ostracion. Without horns. Drayton.

Balistes. Like Coral Island form. Obligate³³
band. Drayton.
Balistes. Brown, tail margined with
white. Drayton.
Balistes. Brownish. Light band through
tail. Dried skin, Drayton.
Monacanthus. Four barbs each side
of tail. Drayton.

At Muthuata, Fiji, "the party witnessed some natives who were employed in taking fish, near the mouth of a small stream, by poisoning the water with the stems and leaves of a climbing Glycine, which grows abundant near the coast." At Ovolau, "sailing along the north side of the island, we passed many fish-weirs formed of reeds, into which the fish are sometimes driven. At other times the fish are lured by food into these traps at high water; the weir is then closed, and the fish taken at low water. The women use the hand net, which is thrown over the school. They have large seines for turtles, as well as smaller ones, both of which resemble our own, the weights being small bits of coral, while for floats they use the seeds of the Barringtonia. These nets are all well made. They likewise make pens of stones, into which they drive the fish and capture them either by spearing them or when the water runs out at low tide. It is also a custom with them to dam up small streams, and stupify the fish with Glycine. Hand nets are sometimes used in a peculiar manner, thus: when they see a large fish take refuge in the coral shelf, they surround the place with a net and drive the fish out into it.

what like Borden Island specimen, but ³⁴
much larger. Hanohulu.

Belone? Same as Samoa. Length $2\frac{1}{2}$ feet.
Almost cylindrical. Lahaina!

Divon. One taken along the beach by a
party of natives in a sort of hand net.
Oahu!

A large individual - or possibly a
different species, some 10 pounds weight,
and spines very short, taken in like
manner same day by another party of
natives. Oahu.

Extensive fish-ponds were seen on Kauai, Hawaiian Islands. "They are of different degrees of saltness. The fish are taken from the sea when young and put into the saltiest pond; as they grow larger, they are removed into one less salt, and are finally fattened in fresh water." He also says "in the neighborhood of Honolulu, there are a number of fish-ponds belonging to the king, in which are bred several kinds of fish. There are many other ponds belonging to individuals. The taro-patches are used occasionally for this purpose,

and not infrequently are seen to contain large fish *****.

They have several modes of taking fish, with the net and hook, and sometimes with poisonous herbs. They likewise take shrimp and small fish by forming a small pen in the soft mud, in one corner of which a net is placed; the shrimp and fish leap over the enclosure of the pen, which is gradually contracted towards the net, which acts like a large seine." At Maui "Dr. Pickering remarks, that the natives appear to be much better acquainted with the fish of their waters, than are the inhabitants of any civilized port we visited. A number of new species were obtained; for which I refer to the Report on the ichthyology of the cruise."

29. Passage from Fiji to Phoenix Coral Group.
Sailed August 11th.

August 13th. By orders of the Commander.

30. Phoenix Coral Group. Arrived among,
August 14th.

Muraena. - Perhaps same as Horden Island
species. Only one seen. Gardner's Island.
S. Lat. $4^{\circ}39'$ W. Long. $174^{\circ}\frac{1}{2}'$.

Exocoetus. Large purplish fin. Vomited
by white gannet (Sula). Gardner's Island.

Tetrodon. One foot long, thick, rather
smooth. Brown above with white spots.
Belly white. Pectoral yellow. Gardner's
Island.

31. Passage from Phoenix Group to
Hawaiian Islands. Sailed August 31st.

Exocoetus. September 4th. Very small
and slender. Crossed the line after nearly
two years in the Southern Hemisphere.

September 5th. Several of a small species
vomited by a gannet (Sula). one apparently
young with short wings.

September 13th. S. Lat. $13^{\circ}58'$ W. Long. $161^{\circ}22'$.

September 16th. Rather large flying fish,
occasionally started to day and once flew
at least 100 yards.

32. Hawaiian Islands. Arrived

September 24th.

Muraena. Very large. Sprinkled with brown
dots on dirty cream colored ground, some

33. Passage from Hawaiian Islands to Oregon³

Sailed April 5th, 1841

April 14th. Flying fish seen, first one in long time.

April 16th. H. Lat. $30^{\circ}15'$.

34. Oregon. Entered Straits of Juan April 30th.

35. Passage from Straits of Juan to San Francisco
~~Sailed April 30th~~

36. Bay of San Francisco

At the salmon-fishery of the Nisqually Indians on the Chickeel's River, he describes "hanging around their lodges were hundreds of lamprey eels, from a foot to eighteen inches

long, and about an inch in diameter. We were told that these fish are caught in great quantities and dried for food; they are also used for candles or torches; for, being very full of oil, they burn brightly." He says of the Willamette "at the time of our visit to the falls the salmon-fishery was at its height, and was to us a novel as well as an amusing scene. The salmon leap the fall; and it would be inconceivable, if not actually witnessed, how they can force themselves up, and after a leap of from ten to twelve feet retain strength enough to stem the force of the water above. About one in ten of those who jumped, would succeed in getting by. They are seen to dart out of the foam beneath and reach about two-thirds of the height, at a single bound: those that thus passed the apex of the running water, succeed; but all that fell short, were thrown back again into the foam. I never saw so many fish collected together before; and the Indians are constantly employed in taking them. They rig out two stout poles, long enough to project over the foaming cauldron, and secure their larger ends to the rocks. On the outer end they make a platform for the fishermen to stand on, who is perched on it with a pole thirty feet long in hand, to which the net is fastened by a hoop four feet in diameter: the net is made to slide on the hoop, so as to close its mouth when the fish is taken. The mode of using the net is peculiar: they throw it into the foam as far up the stream as they can reach, and it being then quickly carried down, the fish who are running up in a contrary direction, are caught. Sometimes twenty large fish are taken by a single person in

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an hour; and it is only surprising that twice as many should not be caught. The river at the falls is three hundred and fifty yards wide, and its greatest fall twenty-five feet. When the water is not very high, the rapids begin some distance above the falls. Some of the Indians are in the habit of coming down in canoes to the brink of the falls, where they secure themselves by thrusting down poles in the crevices of the rocks. There they take many fish, that have succeeded in passing the lower fall, with a hook fastened to the end of a pole. These are esteemed to be of the best flavour, as they are the strongest and fattest. It is said from these places the fish can be seen very distinctly passing up, and are taken very rapidly; but few Indians are willing to expose themselves to the risk of fishing there. The number of Indians at the Willamette Falls during the fishing season is about seventy, including all ages and sexes: there are others who visit the falls in canoes for fish, which at times will raise the number to not far from one hundred. Those fish which are unable to get up, remain some time at the falls, very much exhausted, and finally resort to the smaller streams below." Further on he says "it may be classed as one of the great sources of wealth, for it affords a large amount of food at a very low price, and of the very best quality: it does not extend above the falls. I found it impossible to obtain any data to found a calculation of the quantity taken, but it cannot be short

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of eight hundred barrels; and this after the Indian manner of catching them, as before described. The finest of the salmon are those caught nearest the sea. The settlers and Indians told us that the salmon as they pass up the river become poorer, and when they reach the tributaries of the upper Columbia, they are exceedingly exhausted, and have their bodies and heads much disfigured and cut, and their tails and fins worn out by contact with the rocks. Many of the salmon in consequence die: these the Indians are in the habit of drying for food, by hanging them on the limbs of trees. This is to preserve them from the wolves, and to be used in time of need, when they are devoured, though rotten and full of maggots. The fish of the upper waters are said to be hardly edible, and, compared with those caught at the mouth of the Columbia, are totally different in flavor. The latter are the richest and most delicious fish I ever recollect to have tasted: if any thing, they were too fat to eat, and one can perceive a difference even in those taken at the Willamette Falls, which, however, are the best kind for salting. There are four different kinds of salmon, which frequent this river in different months: the latest appear in October, and is the only kind that frequents the Cowlitz river. The finest sort is a dark silvery fish, of large size, three or four feet long, and weighing forty to fifty pounds. There is one point which seems to be still in doubt, namely, where the spawn of the fish is deposited. It is asserted, and generally believed, that none of the old fish ever return to the sea again. It has not been ascertained whether the

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young fry go to the ocean; and, if they do so, whether as spawn or young fish." He then adds "Mr. Drayton, during the time he remained at the falls, procured a beautiful specimen of a small-sized sucker, which the Indians caught in their nets, and of which he made a drawing. The lamprey eels were also a source of curiosity: they seemed to increase in numbers, crawling up by suction an inch at a time. At these eels the boy who accompanied Mr. Drayton took pleasure in throwing stones, which excited the wrath of the Indians, as they said they would catch no more fish if he continued his sport."

35. Passage from Straits of Fuca to San
San Francisco. Sailed August 3rd.

36. Bay of San Francisco. Arrived August
14th.

37. Passage from California to the Hawaiian
Islands.

November 10th. In Latitude of Oahu.

November 11th. Two flying fish seen to-
day, for the first time since we started.
Also one next day.

38. Passage from Hawaiian Islands to
Wales Island. Sailed November 28th.

December 5th, Sunday. L. Lat. 15° , W. Long. 174° .

December 6th. First flying fish seen this
morning since leaving Oahu.

December 8th. Crossed Long. 180° .

December 13th. E. Long. $175^{\circ} 39'$.

December 14th. Light wind. Flying fish
reported seen to day.

December 15th. Flying fish seen by my-
self, rather small. Long. at 7 P. M. $171^{\circ} 57'$!

December 17th. From Lat. about 17° bore
away N. Westward.

39. Wales Island. Arrived December 20th.
Coral island in L. Lat. $19^{\circ} 15'$, E. Long. 166° .

Muraena. Apparently second species of
Bellinghousen, large and powerful.

Blister. Specimens seen, but not taken.

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Balistes. All black, with green line
along base of dorsal and anal. While
swimming gives continual undulating
motion to these fins. Among rays
with black acanthines.

In an interesting account of the Drummond Island warriors, of the Kingsmill Group, he says "however singular the body-dress is, that of the head is still more so: it consists of the skin of the porcupine-fish, cut open at the head, and stretched sufficiently large to admit the head of a man. It is perfectly round, with the tail sticking upwards, and the two fins acting as a covering and guard for the ears: its colour is perfectly white, and by its toughness and spines affords protection against the native weapons." Their weapons are also barbed with shark's teeth. "Great numbers of fish are also taken in weirs, or enclosures of stone, which are made in the extensive coral flats, that are left bare by every tide: into these the fish are driven at high water, by a number of natives, who surround the shoal; the weir is then closed, and left until the tide falls, when the fish are easily taken in scoop-nets. Large se^eins are often used in places where the bottom renders it practicable to draw them.

Flying-fish are taken in the daytime, by trailing a hook, attached to a short line, from the stern of a canoe. At night they are caught in scoop-nets as they fly toward a lighted torch, held in a part of the canoe."

40. Passage from Waker Island to East
Indies.

December 30th. In sight of Assumption,
one of the most northern of the Ladrões.

January 4th 1842. Flying fish seen this
morning.

January 5th. Flying fish again to-day,
though curving somewhat in their course,
but never more than a right angle.

I have never seen them reverse their course.

January 6th. Flying fish in great number.
One curved around further than a right
angle in its course.

January 7th. Flying fish still numerous.

41. East Indies.

January 8th. Among the Bashee Islands,
off the northern point of Luzon.

January 9th. Off west coast of Luzon.
Flying fish still numerous, in flocks,
appearing to take flight only when alarmed.

January 24th. Along west coast of
Mindoro. Flying fish still common.

January 27th. Along west coast of Panay,
Iloilo Sea. Flying fish abundant.

Hemiramphus. Young at Sulu. Obtained
by Mr. Dana in gauze net from side of
ship.

Belone. Same data as last. Adult seen to
spring out of water, horizontal distance
of several yards, the tail nearly resting

in water.

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Balistes. One of $1\frac{1}{2}$ feet from Sulu market.
Muraena. Greatly like Boudin Island
example; not obtained, though common.
An individual, found by one of the
men, coiled up in the midst of ova,
which were deposited in the concavity
of an old Hippopus shell. The ova
were of the size of humming bird
eggs, in short strings, firmly attached
by one extremity to the Hippopus shell,
and in quantity 2 lbs or more. Mingxi
Islands, North Isthmus of Borneo.

At Singapore there seemed to be gen-
erally a different set of fishes from
those of Sulu and Manila. I saw
little of the brilliant colors of fishes
belonging to coral bottom.

Chirocentrus dorab. Body elongate,
saber shaped, silvery. Length $2\frac{1}{2}$ feet.
Not uncommon in market at Singapore.

42. Passage from East Indies to Cape
of Good Hope. Left Straits of Sumatra,

March 6th.

March 7th. Flying fish reported in
numbers.

March 10th. S. Lat. $14^{\circ}21'$ N. E. Long. $100^{\circ}4'$

March 12th. Flying fish seen this morning.

March 13th. " " again seen.

March 18th. S. Lat. $19^{\circ}12'$ E. Long. $84^{\circ}57'$

March 19th. Flying fish seen to day.

March 20th. " " again this morning.

March 28th. In meridian of Bourbon Island, but far southward.

March 30th. Several flying fish to day.

April 5th. S. Lat. 32° and not more than 150 miles from south coast of Africa.

April 12th. In afternoon in sight of Cape Agulhas and well more entered the Atlantic.

43. Cape Town. Arrived April 13th.

44. Passage from Cape Town to Saint Helena. Sailed April 17th.

45. Saint Helena Island. Arrived May 1st.

46. Passage from Saint Helena to the United States. Sailed May 2nd.

May 6th. First flying fish for some time. Made fully a semicircle in flight. Several during the day and at one time very numerous.

May 7th. S. Lat. $9^{\circ}46'$ W. Long. $13^{\circ}04'$.

May 11th. Flying fish numerous.

May 13th. " " abundant, and observed them often rising a considerable distance from our bows, skimming in a scattered manner over the surface, in various directions, apparently independent of any alarm.

May 14th. S. Lat. over 3° .

May 22nd Sunday. Lat. at noon $2.6^{\circ}40'$.
A flying fish came on board in the evening, the small common one of the North Atlantic, the same we took on our passage out.

May 26th. N. Lat. $15^{\circ}47'$ N. Long. $48^{\circ}30'$.
A large flying fish leaped on board during the previous night.

May 30th. N. Lat. about $24^{\circ}20'$.

May 31st. Some large flying fish seen.

June 9th. Took a pilot on board off New York Bay.

In a preliminary paper we have also described eighteen new species of fishes obtained by the Expedition. To this may

'Proc. U. S. Nat. Mus., 63, 1923, pp. 1 to 26.

he added the following in the present paper:

Lobulosa, new genus. Labridae.

Lobulosa argentea, new species. Labridae.

Wilkesella, new genus. Labridae.

Wilkesella bimaculata, new species. Fiji.

Hyperphapercis, new genus. Parapercidae.

Hyperphapercis fijiensis, new species. Fiji.

description of Species

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Eptatretidae.

Eptatretus dombeyi (Cuvier). Fig. 1

Drawing of an example from Napon Bay, Valparaiso.

Jan. 28, 1839. Color sketch shows the general color heliotrope purple, under surface of head, belly and anal fin salmon buff to buff pink.

Petromyzonidae.

Entosphenus tridentatus (Richardson).

Two adults from the Columbia River.

Eulamiidae.

Glyphis glaucus (Linnaeus).

Colored figure dark blue. Also a figure more dusky and with shorter pectorals, may represent this species.

Eulamia commersonii (Blainville).

Three colored figures, probably of this species. One is of the typical dark color and with pale eye. The other two are much darker, show darker eyes and fin ends pale. They also have fins much mottled or obscurely specked.

Eulamia limbatus (Müller & Henel).

A colored figure agrees fairly with Garman's.

Galeorhinidae.

Mustelus antarcticus Gunther.

Colored figure and ventral view, probably represent this species. The figure is shown as of more or less uniform color above.

Mustelus mustelus (Linnaeus)

A colored figure shows the back above the lateral line spotted finely with white, and is likely referable to this species.

Sphyrnidae.

Sphyrna zygaena ^{Linnaeus} (~~Euphrasen~~).

Colored dorsal view, & ventral and lateral figures. The first does not show any dorsal fin, though it is quite well indicated in the lateral view. The spots on the body as indicated in the dorsal figure are small, pale, and evenly scattered about, some with slightly darker borders.

Systematic account of the
species.

Elopidae.

Elops hawaiiensis Regan. *Fig. 8.*

Head nearly 3?; D.v. 17, 1; A. iv. 11, 1?; 14 scales (damaged) above lateral line to dorsal; snout $3 \frac{5}{6}$ in head from upper jaw tip; eye $5 \frac{1}{3}$; maxillary $1 \frac{3}{4}$; interorbital $4 \frac{2}{3}$. Gill-rakers 8+17, lanceolate. Scales with 13 or 14 basal striae; circuli very fine. Large example, 735 mm., skinned out, from Hilo, and tail and fins, likely of some species of this genus, not determined, and without locality. A colored sketch of this fish bears the following inscription, "caught in our seine at Hilo, June 18th; extraordinary good for the table. Native name "Oio."

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Albulidae.

Albula vulpes Linnaeus. 729.9

Painting of example from Hilo Bay, Jan. 20, 1841.

Chanidae.

Chanos chanos (Forsk.) 729.10.

Head $3 \frac{2}{5}$ to $3 \frac{1}{2}$; depth $3 \frac{1}{2}$ to $3 \frac{7}{8}$; D. iv. to vi. 12, 1;
A. iii, 7 or 8; scales 78 or 79 to caudal base, and 6 to 11 on
latter, counted in lateral line; 13 scales above 1. 1. to
dorsal, 10 or 11 below to anal; 30 to 36 predorsal scales;
snout $3 \frac{7}{8}$ in head; eye $3 \frac{3}{4}$; maxillary $4 \frac{1}{4}$; interorbital $3 \frac{1}{8}$.
Body well compressed, deepest at dorsal origin; caudal
peduncle rather slender, about deep as long. Head width
 $2 \frac{1}{8}$ its length. Snout conic, length $\frac{3}{4}$ its width. Hind

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eye edge midway in head, slightly posterior in young example, and covered with large adipose-lid. Mouth small. Maxillary not quite to eye, slips below long preorbital, toothless. Mandible slightly included in upper jaw. Gill-rakers 147 to 165, very fine, extremely slender, about $2\frac{2}{5}$ of filaments. Scales with 10 or 11 parallel apical striae; base notched; rather coarse circuli 12 to 15, 1. 1. with simple tubes. Dorsal origin midway between front eye edge and caudal base, or midway between front pupil edge and caudal base in young example. Anal small, little nearer caudal base than ventral origin. Ventral inserted behind dorsal origin, reaches $\frac{3}{5}$ to anal. caudal deeply forked, half an eye-diameter longer than head. Pectoral reaches $\frac{3}{5}$ to ventral. In alcohol brownish, paler below. Two examples 120 and 160 mm., from Fiji and Oahu respectively.

A head 145 mm. long, from a large example without locality shows: snout $3\frac{1}{5}$ in head; eye 7; maxillary 4; interorbital $2\frac{1}{2}$. According to Drayton's painting "caught with the seine in Hilo Bay, June 18th. Length 2 feet 6 inches long.

Clupeidae.

Etrumeus micropus (Schlegel). *Fig. 11.*

Head $3\frac{1}{3}$ to 4; depth $5\frac{1}{2}$ to $5\frac{7}{8}$; D. iii, 16, 1; A. iii, 8, 1, branched rays rarely 7; scales (pockets) usually 54, sometimes 53 or 55, to caudal base, and 4 more on latter; 13 or 14 scales (pockets) transversely between ventral and dorsal origins; 21 scales (pockets) before dorsal, rarely 22; snout 3 to $3\frac{1}{8}$ in head from upper jaw tip; eye 3 to

3 $\frac{2}{3}$; maxillary 2 $\frac{2}{3}$ to 2 $\frac{7}{8}$; interorbital 4 to 5. Elongate, partly cylindrical. Head width $1\frac{3}{4}$ to 2 $\frac{1}{8}$ its length. Snout width $1\frac{1}{4}$ to 1 $\frac{2}{5}$ in its length. Eye very slightly advanced. Maxillary not quite reaching eye. Gill-rakers 16+33, slender, lanceolate, slightly longer than filaments or about 2 in eye. Scales with as many as 5 apical striae, also 3 or 4 above and below, but not connected; circuli parallel convex, fine, none basal. Dorsal origin about midway between snout tip and last anal ray base. Ventral inserted close behind dorsal. In alcohol dusky lilac-brown on back, sides and below whitish with brassy tint. Iris whitish. Fins pale. Two from Oahu, 150 to 180 mm. (caudals damaged). We also include five examples in the Academy 70 to 216 mm. long, from Honolulu, for comparison.

According to Drayton's painting "caught by the natives with a drift net with exceedingly fine meshes, Jan. 20, 1841. Hilo Bay, Hawaii. Native name Omaka. Drift net 120 feet long, some only 50 feet. The fish are enticed into the net by baiting with small fish by one man in a canoe, while two men in a larger one haul in the net."

Stolephorus delicatulus (Bennett). *Fig. 12.*

Head $3\frac{1}{4}$ to $4\frac{1}{4}$; depth 4 to 5 $\frac{4}{5}$; D.iii, 8, 1, branched rays sometimes 9; A. iii, 7, 1, branched rays often 8; scales 30 to 33 to caudal base and 3 more on latter; 7 to 9 scales transversely at dorsal origin; predorsal scales 12, sometimes 13; snout 3 $\frac{1}{5}$ to 3 $\frac{1}{2}$ in head from upper jaw tip;

eye 3 to $3 \frac{3}{7}$; maxillary $2 \frac{1}{2}$ to $2 \frac{4}{5}$; interorbital $3 \frac{4}{5}$ to 4. Moderately compressed, fusiform. Head width $2 \frac{1}{8}$ to $2 \frac{1}{3}$ its length. Snout conic, width 1 to $1 \frac{1}{4}$ in its length. Eye advanced, hind pupil edge about midway in head length. Maxillary to or slightly beyond front eye edge, to pupil in young. Mouth small, gape very short; mandible slightly protrudes, rami well elevated inside mouth. Interorbital little convex. Cheek with large prominent striae, extend also on preopercle and opercle. Gill-rakers 6+30, finely lanceolate. Scales thin, caducous, narrowly imbricate, each with 3 to 7 vertical striae, latter better developed with age. Dorsal origin about midway between snout tip and last anal ray base, or about midway between snout tip and caudal base in young. Anal inserted midway between caudal base and ventral origin. Caudal small, well forked, with scaly flap at each lobe basally. Pectoral reaches $\frac{2}{5}$ to ventral. and latter inserted little behind dorsal origin. In alcohol back dark brown, sides and below silvery white. Iris white. Fins all pale. Four examples 32 to 33 mm. long from Tongatabu. We also include for comparison 7 in the Academy from the Philippines 50 to 62 mm. long.

Spratella arcuata (Jenyns).

One example from Rio Janeiro, in poor condition, which agrees with Jenyn's imperfect account, except he compares it with Clupea harengus Linnaeus and says, "teeth the same, and very minute," which would infer the presence of vomerine teeth, though such are absent in our example. He also

says his fish "differs from the Herring in having the ventrals exactly in a line with the commencement of the dorsal, this being placed a little further back than in that species." Thompson reports 7 examples from Montevideo, the largest 110 mm. which appear to agree in most every respect.

One example shows: Head $3 \frac{7}{8}$; depth $3 \frac{7}{8}$; D. iii, 14?; A.iii, 16?; scales (pockets) 37? to caudal base; snout $3 \frac{1}{5}$ in head from upper jaw tip; eye $3 \frac{1}{3}$; maxillary 2; interorb-
1 Proc. U. S. Nat. Mus., Vol. 50, 1916, p. 405.

ital 5; serrae 18+13. mandible protrudes. Maxillary not quite reaching pupil. Opercle and cheek smooth. Gill-rakers about 13+32, fine, slender, about $\frac{2}{5}$ longer than filaments or equal eye. Inside of gill-opening entire. Scales thin, very caducous; circuli very fine in parallel convex courses, though many irregular over greater basal portion, none apical. Dorsal origin midway between hind pupil edge and caudal base. Ventral inserted slightly before dorsal origin. Length 87 mm. (caudal damaged).

This species does not appear to have been previously recorded so far to the north as Rio Janeiro. We were therefore led to compare Clupea janeiro Eigenmann, 2 a name based on C. brasiliensis Steindachner 3 as the latter is preoccupied by Schneider 4. Just what genus it belongs to has not been ascertained. It differs, according to Steindachner's description, in the more numerous post-ventral serrae (19), scales with 3 to 5 striae, ventral inserted under middle of

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dorsal base and a small dark spot at hind edge of gill-opening.

2 Ann. N. Y. Acad., vol. 7, 1894, p. 627.

3 Sitz. Als. Wiss. Wien, vol. (1) 80, 1879, p. 182. Rio Janeiro.

4 Syst. Ich. Bloch, 1801, p. 427, Brazil.

Sardinia sagax (Jenyns). *Fig. 13.*

Head $3 \frac{1}{6}$ to $3 \frac{1}{5}$; depth 4 to $4 \frac{1}{5}$; D. iii, 14? or 15; A. iii, 14? or 15; scales 52? to 55 to caudal base; 12 to 14 scales transversely between dorsal and ventral origins; predorsal scales 17 to 22; snout $3 \frac{1}{3}$ to $3 \frac{2}{5}$ in head from upper jaw tip; eye $4 \frac{1}{2}$ to $5 \frac{2}{5}$; maxillary $2 \frac{1}{6}$ to $2 \frac{1}{4}$; interorbital $4 \frac{1}{2}$ to $4 \frac{4}{5}$; serrae 18 to 21 + 14? or 15?.

Elongately ovoid, deepest at dorsal origin, well compressed; least depth of caudal peduncle $1 \frac{1}{3}$ its length or $3 \frac{1}{8}$ in head from upper jaw tip. Head width $2 \frac{1}{8}$ to $2 \frac{1}{4}$ in its total length. Snout width $1 \frac{1}{4}$ to 2 in its length. Hind pupil edge slightly advanced from middle in head length; adipose eyelid well developed. Mouth small, gape short. Maxillary nearly or quite to pupil center, about first $\frac{3}{5}$ of upper edge slipping below preorbital; expansion $1 \frac{7}{8}$ in eye. Mandibular rami well elevated inside mouth. Interorbital level, with low median ridge and 3 smaller supercilliary ridges each side. Cheek and preopercle with 6 to 8 obsolete to very prominent striae. Gill-rakers about 48 to 58 + 75 to 88?, very slender, fine, $\frac{2}{5}$ longer than filaments or about equal $1 \frac{2}{5}$ eye diameter. Scales with circuli as parallel vertical striae, not over basal surface, single transverse complete subbasal stria, and 11 to 12 marginal striae. Dorsal

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origin nearer mandible tip than caudal base by snout length. Anal well behind dorsal, last two rays little enlarged. Pectoral (damaged) apparently reaches dorsal? Ventral inserted little nearer caudal base than eye front (damaged), reaches $2/5$ to anal. In alcohol brownish on back, sides and lower surface, with eye, pale brassy. Fins pale.

Two from Callao, 125 to 223 mm. long (caudal broken). Although in poor condition they agree with Regan's account.⁵ A third example, same data, 90 mm. long, is in very poor preservation.

In this connection we have examined a dried skin 352 mm. long from Valparaiso, Chile, now in the Commercial Museum of Philadelphia. It shows: Head $3 \frac{3}{4}$; depth 4; D. iii, 17; A. iii?, 15; scales 50 in lateral series to caudal base; 14 scales transversely at dorsal origin; snout $3 \frac{1}{2}$ in head; eye 4; maxillary $2 \frac{2}{5}$; interorbital $4 \frac{1}{3}$. Maxillary reaches pupil. Opercular striae strong.

Clupea advena Philippi 6 is undoubtedly a synonym.

⁵ Ann. Mag. Nat. Hist. London, (8) vol. 18, 1916, p. 13; Pl. 1, fig. 1.

⁶ Arch. Naturg., 45, 1879, p. 161, Pl. 10. Chile.

Potamalosa notacanthoides (Steindachner).

Drawing of Valparaiso example.

Fig. 14.

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Sardinella sirm (Forsk.)^{FSK}. Fig. 15.

Drawing of Samoan example.

Sardinella aurita Valenciennes. Fig. 16.

Head $3 \frac{3}{5}$; depth $4 \frac{1}{5}$; D. iii, 15; A. iii, 13?; P. i, 15; V. i, 8; scales 47 to caudal base and 5? more on latter; 14? scales transversely at dorsal origin; 23 predorsal scales; head width $2 \frac{1}{5}$ in its length; head depth $1 \frac{2}{5}$; mandible 2; dorsal base $1 \frac{3}{4}$; anal base 2; least depth of caudal peduncle $3 \frac{2}{5}$; snout $3 \frac{1}{2}$ in head from upper jaw tip; eye $4 \frac{1}{6}$; maxillary $2 \frac{1}{2}$; interorbital 5; serrae 19 + 14.

Elongately ellipsoid, deepest about dorsal origin, well compressed, back convex; caudal peduncle well compressed; abdominal serrae small. Head well compressed, pointed, flattened sides converge below. Snout conic, compressed, width $1 \frac{1}{3}$ its length. Eye with hind pupil edge slightly advanced in head length; adipose eyelid well developed. Maxillary to pupil, about first $\frac{2}{3}$ of upper edge slipping below preorbital, expansion $1 \frac{1}{2}$ in eye. Upper jaw with median notch. Scarcely any teeth in front of jaws, and few below rudiments. Vomer toothless; each palatin and upper surface of tongue covered with broad bands of fine simple teeth. Lower jaw slightly protrudes, rami well elevated inside of mouth. Nostril simple pore, nearer snout tip than eye. Inter-

orbital level, with well developed median ridge and two smaller supercilliary ridges on each side. Cheeks and preopercle with wide striae radiating lines; opercles smooth or with only very obscure traces of striae.

Gill openings forward to about last third in snout. Gill-rakers 70 - 130, very slender, fine, little longer than filaments or about as long as snout. Pseudobranchiae large, though little smaller than gill-filaments. Isthmus slender, long, notch inside gill-opening below and 2 fleshy points above.

Scales rather caducous, many having fallen, large, rather narrowly imbricated, smaller on back and caudal base; vertical striae 4 or 5, usually divided medially or at least most all except outermost. Dorsal origin about midway between mandible tip and last anal ray base. Anal midway between ventral origin and caudal base. Pectoral low (damaged), nearly half way to ventral, and latter inserted opposite first fourth in dorsal length, small. In alcohol brown on back, sides and below pale brassy-brown. Fins dull.

One 135 mm. long (caudal damaged), from "Callao", probably erroneous as the specimen was likely procured at Rio Janeiro?. Also one from the last locality 67 mm. (caudal broken) and another without data 123 mm. (caudal broken). The last shows: Head $3 \frac{1}{3}$; depth $3 \frac{7}{8}$; D. iii, 15; A. iii, 13; scales 45 in lateral series to caudal base and 5 more on latter; 11 scales transversely at dorsal origin; 17 predorsal scales; snout $3 \frac{1}{3}$ in head; eye 4 1.6; maxillary $2 \frac{2}{5}$; interorbital 5; serrae 19 + 16.

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Harengula Valenciennes.
Subgenus Harengula Valenciennes.

Harengula humeralis Valenciennes. Fig. 17.

Drawing of example from Rio Janeiro.

Harengula punctata (Ruppell).

Head $3\frac{1}{4}$; depth $4\frac{3}{4}$; D. iii, 13?; A. iii, 9?; snout $3\frac{3}{4}$ in head; eye 4; maxillary $2\frac{1}{3}$; interorbital $4\frac{1}{2}$; serrae 18 + 15?; scales about 42? to caudal base. Head width about 3 in its length. Maxillary not quite to eye center, about first third in pupil. Mandible slightly protrudes. Opercle and cheeks smooth. Gill-rakers about 20 - 35 slender, fine, longer than filaments or about half of eye. Scales show only numerous fine parallel vertical striae, evidently circuli, and no large striae; all very caducous. Dorsal origin about midway between snout tip and last anal ray base. In alcohol back brown; sides, undersurface and iris silvery-white, but without distinct or pale lateral band.

Eight young examples, 35 to 40 mm. Caudal damaged. Balabac.

Harengula argyrotaenia (Bleeker). Fig. 18.

Drawing of example from Manila.

Harengula peruana Fowler and Bean.

Harengula peruana Fowler and Bean,
Proc. U.S. Nat. Mus., 63, 1923, p. 2.
Callao, Peru.

Subgenus Wilkesina Fowler and Bean.

Wilkesina Fowler and Bean, l.c., p. 3.

Type Harengula fijiense Fowler and Bean,
orthotypic!

Harengula fijiense Fowler and Bean.

Harengula fijiense Fowler and Bean,
l.c. Fiji.

Brevoortia pectinatus Jenyns. *Fig. 19.*

Three examples in poor condition, largest 200 mm. (caudal damaged). The two smaller examples in poor condition. All from Rio Janeiro. Our largest example shows: Head $3\frac{1}{4}$; depth $2\frac{5}{6}$; D iii; 15; A. iii, 18; scales 55 in median lateral series to caudal base and 5 more on latter; 25 scales transversely at dorsal origin; 46 predorsal scales; snout $3\frac{3}{4}$ in head from upper jaw tip; eye 6; maxillary $2\frac{1}{6}$; interorbital $3\frac{3}{4}$; Gill-rakers 85 to 90 on ceratobranchial of

first arch; scales with about 15 to 24 apical serrae.

We compared a large series of all ages of the closely related B. tyrannus (Latrobe) in the Academy, from Massachusetts, New Jersey, Delaware, Maryland, North and South Carolina, which show: Head $2\frac{3}{4}$ to $3\frac{1}{5}$; depth $2\frac{2}{5}$ to $3\frac{1}{5}$; D. iv, 16, varies frequently 15, 17 or 18 branched rays; A. iii, 19, 1, varies frequently in branched rays 17 or 18, seldom 20, rarely 16 or 21; scales in median lateral series usually 50, vary 45 to 77, fewer in young and often more in adult; 5 to 8 scales on caudal base; 23 scales transversely at dorsal origin, frequently 25, vary sometimes 21 to 24 or 26 to 28; predorsal scales 30, frequently 33, 34, 36 or 41, often 31, 32, 35 or 38, seldom 26 to 29, 37, 39 to 40 or 45; snout $3\frac{2}{5}$ to $4\frac{1}{4}$ in head from upper jaw tip; eye $3\frac{1}{2}$ to $6\frac{1}{2}$; maxillary 2 to $2\frac{1}{4}$; interorbital $3\frac{4}{5}$ to $4\frac{1}{2}$; serrae 19, frequently 20, often 18, seldom 17, rarely 21 or 22 - 13, frequently 12, often 14, seldom 11; length 60 to 356 mm. A New Jersey example 250 mm. Shows about 70 Gill-rakers on ceratobranchial of first arch, compared with 80 - 140 Gill-rakers usually counted. Scales with 30 to 40 apical serrae.

These comparisons are made as the limits of distribution of the two species have not yet been given. It is thus likely that B. pectinatus occurs northward to Rio Janeiro. The study of much Brazilian material is necessary, however, before the above characters may be shown to be definite.

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Ethmidium maculatum (Valenciennes).

Fig. 20 -

Head 3; depth $2 \frac{9}{10}$ to $2 \frac{7}{8}$; D. iii, 15 to 17;
A. ii, 13 or 14; scales 46? to 48 in median lateral series
to caudal base; 17 or 18 scales transversely at dorsal
origin; 23 or 25 predorsal serrae; 18 or 19 - 16 or 17
abdominal serrae; snout $4 \frac{3}{5}$ to $4 \frac{9}{10}$ in head; eye $7 \frac{1}{8}$
to $8 \frac{1}{2}$; maxillary $2 \frac{1}{2}$ to $2 \frac{1}{2}$; interorbital $4 \frac{3}{5}$ to $4 \frac{7}{8}$.
Head width $2 \frac{2}{5}$ to $2 \frac{3}{5}$ in its total length. Snout conic,
long as wide, with bony knob above at tip. Eye advanced,
adipose eyelid broad. Mouth large, mandible included, fits
in upper jaw which is notched at front to receive mandibular
tip. Maxillary extends back slightly beyond eye; expansion
wide as eye. No teeth. Interorbital convexly elevated, depres-
sed medially. Opercle with few obsolete oblique striae. Gill-
rakers about 110 + 125, extremely slender and fine, nearly
3 in head; filaments $1 \frac{4}{5}$ in gill-rakers. Scales with 1 to
5 vertical or transverse striae; broad depressed apical den-
ticles 13 to 19; circuli as vertical striae, fine. In alcohol
pale brown, with olivaceous tinge above; lower surface paler
or whitish. about a dozen obscure dusky spots along side of
back and lower shorter parallel row below; fins pale brown.

Two from Peru. 215 mm.? (caudal damaged).

Dorosomatidae.

Anodontostoma chacunda (Buchanan & Hamilton).

Fig. 21.

Drawing of example from Manila.

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Engraulidae.

Engraulis ringens Jenyns. *Fig. 22.*

Head 3 to $3 \frac{1}{3}$; depth $4 \frac{1}{8}$ to $5 \frac{2}{5}$; D. iii, 10, 1; branched rays vary 13; A. iii, 17, 1 or 18 1; scales 35 or 36 in median lateral series to caudal base and 3 more on latter; 9 or 10 scales transversely at dorsal origin; 22 to 24 predorsal scales; snout 6 to 7 in head; eye $4 \frac{1}{5}$ to $4 \frac{1}{4}$; maxillary $1 \frac{1}{3}$ to $1 \frac{1}{2}$; interorbital $5 \frac{4}{5}$ to $6 \frac{1}{3}$.

Body elongately fusiform, deepest at dorsal origin, rather plump, sides slightly constricted below and abdominal edge without median keel. Caudal peduncle compressed, least depth $1 \frac{1}{2}$ to $1 \frac{2}{3}$ its length. Head width $2 \frac{7}{8}$ to 3 in its length. Snout conic, compressed, long as wide. Eye large, hind edge at first $\frac{2}{5}$ in head length. Adipose eyelid completely covers eye. Mandible forward about half way in snout length. Maxillary nearly straight, reaches preopercle ridge, expansion about 4 in eye. Uniserial minute maxillary teeth whole extent, nearly uniform, separate in front of mouth. Short row of few minute teeth in front of lower jaw. No vomerine teeth. Nostril slightly nearer eye than snout tip. Interorbital convex, Gill-rakers 40 to 48 - 42, fine, slender, lanceolate, much longer than filaments or equal $1 \frac{1}{8}$ to $1 \frac{1}{4}$ eye diameter. Scales large, narrowly imbricated, thin adherent; with numerous discontinuous marginal striae of which 5 to 12 basal; circuli fine and largely transversely vertical. Dorsal origin midway between hind eye edge and caudal base, slightly advanced in smaller examples. Anal inserted behind

depressed dorsal tip. Pectoral 2 in head, ventral about 3. In alcohol; brown on back, sides and lower surface silvery-white, also iris. No silvery lateral band but line of demarcation along back contrasted. Fins all pale.

Seven examples from Callao, Peru, and Valparaiso, Chile, 90 to 140 mm. An example in the Academy from Pecosmayo Bay, Peru, 115 mm. long, also included with the above.

Our examples agree with the account by Jenyns as far as it allows. E. pulchellus Girard is a synonym, though his figure(7) shows about 50 scales in a lateral series to the caudal base and 2 more on latter, and about 13 transversely.

Evermann and Radcliffe have retained E. nasus Kner and Steindachner in Engraulis as a questionable species, though it is certainly an Anchoviella. An example in the Academy

(7). U. S. Naval Astronom. Exped., 185, p. 247, Pl. 31, fig. 29.

probably from ^aPecosmayo Bay, Peru, when compared, in every way substantiates this view. As the two forms are similar in many ways the following notes are given for the Pecosmayo Bay example of A. nasus (Kner and Steindachner).

Head $3 \frac{1}{8}$; depth $4 \frac{1}{5}$; D. iii, 12, 1; A. iii, 23, 1; scales (pockets) about 37 in lateral series to caudal base and 3 more on latter; scales (pockets) transversely 9; predorsal scales (pockets) 21; snout $5 \frac{1}{3}$ in head; eye $4 \frac{1}{6}$; maxillary $1 \frac{1}{8}$; Interorbital $4 \frac{1}{2}$. Body well compressed, more so than in E. ringens, deepest at preventral; abdominal

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and predorsal edges scarcely keeled medially. Caudal peduncle compressed, length $4/5$ its least depth, which is $3 \frac{1}{5}$ in head. Head width 3 in its length, profile nearly straight and similarly inclined. Snout conic, conspicuously protruded, long as wide and lower profile slightly concave. Eye rounded, high, well advanced; adipose eyelid completely covers eye. Mouth large, front above with rather wide median depression. Maxillary straight, expansion 3 in eye, reaches mandibular joint or more backward than in E. ringens. Uniserial minute maxillary teeth, not united in front of mouth, mostly inclined forward and posterior little enlarged, extend to tip. Similar erect mandibular teeth. No vomerine teeth. Narrow palatine area of minute asperities. Upper pharyngeal area with minute asperities. Tongue small knob in front of mandible, with few minute asperities above, though basibranchial shaft finely asperous above. Mandible tip forward to front eye edge. Nostrils little nearer eye than snout tip. Interorbital broadly convex. Cheeks and opercle smooth, without venules on latter. Gill-opening forward to hind pupil edge. Gill-rakers 24 - 28, lanceolate, slender, $1 \frac{1}{3}$ in eye, little longer than filaments. Scales caducous, narrowly imbricated, little enlargen on costal region, with 6 or 7 basal and 6 to 8 vertical striae, latter often irregularly or alternately incomplete. Dorsal origin midway between hind eye edge and caudal base. Anal inserted opposite last third of dorsal base or little nearer caudal base than pectoral origin. Caudal deeply forked. Pectoral $1 \frac{4}{5}$ in head, reaches

Ventral, which $2\frac{3}{4}$. In alcohol; faded dull brownish generally. Head dull brown above, sides and iris silvery-white, also flanks, with boundary above from back not sharply defined and no distinct silvery lateral band. Fins pale. Length 115 mm. (caudal damaged).

It agrees in most every respect with the original account by Kner and Steindachner and surely should in no way be confused with E. ringens Jenyns or E. mordax Gunther, as Gunther attempted. Aside from the great disparity of gill-rakers in E. ringens and Anchoviella nasus the latter is more compressed, has a more prominent and longer snout, longer and more sharply pointed maxillary, shorter mandible, much longer pectoral, more anteriorly inserted anal and the ventral inserted much more anterior to the dorsal origin.

Engraulis mordax Girard. Fig. 23.

Drawing of example from San Francisco, Calif.

Anchoiella mauii Fowler and Bean.

Anchoiella mauii Fowler and Bean,

Proc. U. S. Nat. Mus., 63, 1923, p. 4.

maui, Hawaiian Islands.

Anchoiella salvatoris Fowler and Bean.

Anchoiella salvatoris Fowler and Bean,

l.c., p. 6, Rio Janeiro, Brazil.

Anchoiella comersoniana (Lacépède).

Fig. 24.

Drawing of an example from Manila.

Thrissocles setirostris (Broussonet). *Fig. 25.*

Head $4\frac{1}{4}$ to $4\frac{1}{2}$; depth $3\frac{1}{2}$ to $3\frac{3}{5}$; D. iii, 10, 1, branched rays vary 11; A. iii, 33, 1, branched rays vary 32; snout 6 in head; eye $3\frac{3}{4}$ to 4; maxillary $1\frac{3}{5}$ to $1\frac{2}{3}$; interorbital $3\frac{3}{4}$ to $4\frac{1}{4}$; scales about 38 to caudal base and 4 more on latter; 10 scales transversely at dorsal origin; 23 predorsal scales; serrae 16 to 18 + 9. Body strongly compressed, deepest at dorsal origin. Caudal peduncle well compressed, least depth $2\frac{1}{5}$ its length. Head width $2\frac{1}{3}$ to $2\frac{3}{4}$ its length. Snout short, convex, length half its width. Eye with hind edge at first $\frac{2}{5}$ in head length, covered with adipose eyelid. Mandible but slightly shorter than snout. Maxillary extends back as filament within an eye-diameter of anal, its entire lower edge to pectoral base with row of fine teeth. Row of very much finer teeth along each mandibular edge. Several small teeth each side of vomer, and row of very fine ones down each palatine. Interorbital convex. Gill-rakers 5 - 11, lanceolate, long as filaments or about $\frac{2}{3}$ of eye. Scales caducous, narrowly imbricated; 9 to 14 transverse striae mostly complete; circuli fine and mostly parallel with striae. Dorsal origin about midway between front eye edge and caudal base, first branched ray $1\frac{1}{8}$ in head. Anal begins below last dorsal ray base, or slightly nearer pectoral origin than caudal base, first branched ray $1\frac{1}{3}$ to $1\frac{3}{4}$ in head. Pectoral nearly to or slightly beyond ventral base. Ventral not quite reaching anal, $1\frac{3}{5}$ in head. In alcohol: back purplish-brown, sides

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and below silvery-white, without lateral band. Adipose humeral area brown with dusky specks. Fins pale. Iris whitish. One from Manila 123 mm. long.

A Philippine example in the Academy included above, 125 mm. long.

Salmonidae.

Salmo clarkii Richardson. *Figs. 26 and 27.*

One about 180 mm. long from the Columbia River, Oregon, without caudal and in very poor condition. It has the dark spots numerous on the head and traces of pale or obscure ones on the belly. One from Puget Sound 68 mm. long has A. ii, 10. Also another 105 mm. (caudal damaged) same locality and anal formula. It is in poor condition and has 8 parr marks of dark color along side of body.

Plate with 3 figures, lower showing a typical S. clarkii, by Drayton from an example caught with a hook, salt salmon bait, at the sawmill 5 miles above Fort Vancouver. June. The median figure also by Drayton, represents a parr "Caught at Dr. Whitinans with a hook" in the Walla Walla River July 10, 1840. The uppermost represents another figure by Drayton from the Willamette Falls, June 1841. The following accompanies the painting, "Caught near the falls from below, with a hook. The only one taken in several days. These are very numerous in the spring. The color above are not quite as brilliant as it was when taken in the water alive," We are undecided as to these other two

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figures as they may be either S. clarkii (Richardson) or S. gairdneri Richardson.

Salmo gairdneri Richardson. *Fig. 28.*

Painting of one from Walla Walls on July 16, 1841.

Oncorhynchus tschawytscha (Walbaum). *Fig. 29.*

Painting by Drayton from example from the Willamette Falls, June 12, 1841. Example 3 ft. $10\frac{1}{2}$ inches in length. the notes state "some of these fish are much darker than the above, and some lighter and more silvery on the belly. They are very numerous at the falls and hundreds are seen at one time leaping in the riffled water and trying to ascend. Some get up over the leper falls. They often leap to 10 feet out of water, some 15 feet, directly under the falls. Only this kind here in May and June, July and August two others come up. Also wash drawing, probably of this species.

Argentinidae.

Retropinna retropinna (Richardson).

Head $4\frac{1}{3}$ to $4\frac{1}{2}$; depth $5\frac{1}{4}$ to $5\frac{2}{5}$; D. iii, 9, or 10; A. iii, 17 or 18; scales 56 to 58 in lateral series to caudal base and 4 more on latter; 12 scales transversely at dorsal

origin; predorsal scales 34 to 36; snout $3\frac{3}{4}$ to 4 in head; eye $3\frac{1}{8}$ to $3\frac{1}{2}$; maxillary $2\frac{1}{4}$ to $2\frac{1}{2}$; interorbital $3\frac{1}{4}$: Body well compressed, deepest at ventral origin. Caudal peduncle compressed, least depth half its length or 3 in head. Head well compressed, width $2\frac{1}{4}$ in its length. Snout conic, length $\frac{4}{5}$ its width. Eye large, hind edge midway in head length. Mouth well inclined, mandible slightly projects. Maxillary extends slightly beyond eye center, but not to hind pupil edge. Row of small teeth in each jaw. Narrow band of fine teeth across vomer and along maxillary edge, also on each palatine; narrow band of teeth along each side of tongue. Interorbital about level. Gill-rakers 6-15, lanceolate, equal filaments or half of eye. Scales mostly uniform, little smaller on breast; no striae; corculi large, about 15 to 20 and leave broad opaque median area. Dorsal inserted little nearer pectoral tip than caudal base, fin about $\frac{2}{5}$ to latter. Anal inserted little behind dorsal origin or little nearer ventral origin than caudal base. Pectoral $1\frac{1}{5}$ to $1\frac{1}{3}$ in head, extend $\frac{2}{3}$ to ventral. Last $1\frac{2}{5}$ to $1\frac{1}{2}$ in head, and reaches half way to anal. In alcohol; dull uniform brown, with dull or obscure brassy band along side medially. Head largely brassy. Fins brownish. Length 75 to 85 mm. (caudal damaged).

Four examples without data, doubtless from New Zealand?.

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Galaxiidae.

Galaxias attenuatus (Jenyns).

Head 5 to $5 \frac{1}{5}$; depth $7 \frac{1}{2}$ to 9?; D. iv, 8, to 10; Anal iv, 12; snout $3 \frac{1}{8}$ to $3 \frac{2}{5}$ in head measured from upper jaw tip; eye $2 \frac{3}{4}$ to $4 \frac{1}{2}$; maxillary $2 \frac{1}{2}$ to $3 \frac{1}{4}$; interorbital $2 \frac{3}{4}$ to $3 \frac{1}{3}$. Body slender, long, moderately compressed; least depth of caudal peduncle 3 to $3 \frac{1}{5}$ in head. Head width 2 to $2 \frac{2}{5}$ in its total length. Snout convex, length $1 \frac{1}{4}$ to $1 \frac{1}{2}$ its width. Eye long as snout, hind edge midway in head length. Maxillary to or beyond front eye edge, not quite to pupil. Mandible projects slightly beyond snout tip. Single row of small uniform teeth in each jaw, not on maxillary; each palatin with row of simple teeth approximating vomer; tongue with 2 close-set rows of teeth, front ones enlarged and approximate. Interorbital slightly convex. Gill-rakers 3 to 5 + 8 to 11, lanceolate, about $\frac{1}{3}$ of filaments and latter 2 in eye. Branchiostegals 6. Dorsal inserted midway between ventral origin and caudal base, much nearer ventral in young; fin $\frac{3}{5}$ to $\frac{3}{4}$ to caudal base, or $\frac{2}{5}$ in young. Anal origin opposite that of dorsal, or very slightly behind dorsal origin in young; fin $\frac{2}{3}$ to caudal base. Pectoral $1 \frac{3}{5}$ to $1 \frac{3}{4}$ in head; about $2 \frac{1}{2}$ to 3 to ventrals, $2 \frac{1}{4}$ in young. Ventral $1 \frac{3}{4}$ to $1 \frac{4}{5}$ in head, reaches $\frac{2}{5}$ to anal. In alcohol; uniform brownish. Length 92 to 113 mm. (caudal damaged).

Two from New Zealand and one from Sydney.

Thompson mentions ⁽¹¹⁾ that compared with G. maculatus the most sharply defined difference is that of color, his measure-

ments overlapping with the examination of a large series. We have, however, also included 6 examples from Tierra del Fuego. These have the ventral origin midway between snout tip, or nearer same, than caudal base. They also show the back with slightly darker round spots of rather large or moderate size fairly close-set or sometimes marbled. They measure 48 to 50 mm.

(11) Proc. U. S. N. M. Vol. 50, 1916, p. 422.

Galaxias maculatus (Jenyns).

Fig. 30.

Head $4\frac{1}{2}$ to $4\frac{3}{4}$; depth $6\frac{1}{2}$ to 7; D. iv, 8; A. iv, 12 or 13; snout $3\frac{2}{3}$ to $3\frac{3}{4}$ in head; eye $3\frac{1}{2}$ to $3\frac{3}{4}$; maxillary $2\frac{3}{4}$ to 3; interorbital 3. Body moderately slender, compressed. Head width 2 to $2\frac{1}{8}$ in its length. Snout convex, length $1\frac{1}{2}$ its width. Eye large, hind edge about midway in head. Maxillary not quite to pupil. Mandible slightly included within upper jaw. Teeth uniserial, small, even; short row on each palatin and front of vomer. Interorbital broadly convex. Gill-rakers 2 + 7, lanceolate, little shorter than filaments and latter about half of eye. Branchiostegals 7. Dorsal inserted about midway between caudal base and ventral origin, fin about half way to caudal. Anal origin slightly behind dorsal origin, fin $\frac{3}{5}$ to caudal base. Ventral inserted much nearer caudal base than snout tip. In alcohol; faded brownish generally, with traces of

darker spots about size of pupil, largely as 2 or 3 lateral series. Fins pale, unicolor.

Five from Tierra del Fuego 53 to 63 mm. long.

According to the original painting "11 specimens from fresh-water lakes near Orange Harbor."

Galaxias fasciatus Gray.

Fig. 31.

Head 4; depth $4 \frac{2}{3}$; D. iv, 9; A. iv, 11; snout $3 \frac{1}{3}$ in head from upper jaw tip; eye $5 \frac{1}{8}$; maxillary 2; inter-orbital $2 \frac{1}{8}$.

Body rather deep, well compressed; least depth of caudal peduncle $2 \frac{1}{8}$ in total head length. Head width $1 \frac{3}{5}$ its length. Snout wide, depressed, length $\frac{3}{5}$ its width. eye high, center about first third in head. Mouth large, lower jaw slightly protruding. Maxillary to hind eye edge, width about half of eye. Row of simple conic teeth in each jaw, upper not on maxillary edge, becoming slightly and gradually larger till below nostrils, then very small; lower teeth enlarged at symphysis and on each mandibular ramus laterally; row of teeth on each palatin approximating vomer, several enlarged inwardly directed front ones; tongue with angle of teeth also becoming larger at apex. Nostrils together, midway in snout. Interorbital slightly convex. Gill-rakers 6 - 9 lanceolate, about $\frac{2}{3}$ length of filaments, latter $\frac{7}{8}$ of eye. Branchiostegals 8, Dorsal inserted nearer

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caudal base than ventral origin. Anal origin opposite that of dorsal. Pectoral $1 \frac{2}{5}$ in head, reaches $1 \frac{3}{4}$ to ventral. Lattae $1 \frac{2}{5}$ in head. In alcohol; uniform brownish. Length 178 mm. (caudal damaged).

One from New Zealand. According to the original painting "Fresh-water near Bay of Islands. March 1840."

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Maurolicidae

Viniguerria attenuata (Cocco). Fig. 31a.

Drawing of an example by J. H. Richard,
without data.

Stenoptychidae

Argyropelecus olfersii (Cuvier). Fig. 31b.

Drawing by Alfred J. Agate from an
example obtained August 30, 1838 in 2.
Lat. $33^{\circ}40'$ W. Long. $62^{\circ}10'$, by Ship Relief.

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Muraenidae (Anguillidae auct.).
Anguillidae.


Muraenid
Anguilla mauritiana (Bennett).

Head about 8; depth 21; snout $4 \frac{4}{5}$ in head from upper jaw tip; gape $3 \frac{1}{4}$; interorbital $6 \frac{1}{4}$; mandible $2 \frac{1}{3}$; pectoral 4. Body compressed, combined head and trunk $1 \frac{2}{5}$ in rest of body. Head width $3 \frac{1}{3}$ its length. Snout elongate, slender as viewed above, width $1 \frac{1}{4}$ its length. Eye moderate, largely lateral, $1 \frac{3}{5}$ in snout. No eyelids. Gape large, though apparently only reaching back opposite hind pupil edge. Lips rather wide, fleshy, especially lower. Lower jaw well protruded. Teeth conic, largely uniform, in broad bands in jaws, narrowed to rictus. Outer row of lower teeth uniformly larger than others. Vomerine band nearly wide as upper jaw bands in front, likewise narrowed behind. Tongue free. Interorbital level. Dorsal begins before anal for space about equal to $1 \frac{1}{5}$ in head.

Color in alcohol: uniform brownish. Iris with slaty tinge. One specimen 287 mm. in poor condition, without locality, possibly from Manila?.

Examples in the Academy from Sumatra, Philippines and Samoa, show: Head $5 \frac{7}{8}$ to $7 \frac{1}{2}$; depth 14 to 18; snout $4 \frac{1}{2}$ to $5 \frac{1}{8}$ in head measured from upper jaw tip; gape $2 \frac{3}{4}$ to $3 \frac{1}{8}$; interorbital $4 \frac{1}{2}$ to 5; pectoral $2 \frac{3}{4}$ to $3 \frac{4}{5}$; eye 2 to $2 \frac{1}{3}$ in snout; length 182 to 400 mm. The large Sumatran example,

when fresh in arrack, dark brown above mottled with pale or dull yellowish and olivaceous. Head and trunk below whitish. Narrow light edge around vertical fins, behind and partly marginal narrow dark band around end of tail.

Compared with small examples of about equal size from the Philippines the muzzle is found much broader, though this is likely due to the state of preservation of the Wilkes specimen. The Academy material further shows the scales all more or less distributed at right angles or as vertical rows with angles ; 5 to 7 times long as wide when adult and 50 to 70 reticulating circuli in long diameter.

Muraena
Anguilla aneitensis (Günther).

Head $8\frac{1}{2}$; depth $22\frac{1}{4}$; snout $4\frac{1}{5}$ in head; gape 3; interorbital $4\frac{7}{8}$; mandible $2\frac{1}{5}$; pectoral $3\frac{2}{3}$.

Body compressed, combined head and trunk about $1\frac{1}{2}$ in rest of body. Head width $2\frac{2}{5}$ its length, pharynx scarcely swollen. Snout well depressed, surface convex, length about $\frac{4}{5}$ its width. Eye small, largely superior, 2 in snout. No eyelids. Mouth large, horizontal, gape extending back little beyond eye. Lips about equally wide, fleshy. Jaws about equal. Teeth conic, uniform, in broad bands in jaws narrowed to rictus. Vomerine bands wide as jaw bands at first, rapidly narrows behind.¹⁷ Tongue free. Interorbital scarcely convex to level. Gill opening $1\frac{3}{4}$ in snout.

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Scales in rather parallel longitudinal rows, same overlapping, each with about 20 to 22 reticulate circuli in longitudinal diameter, width usually 3 times length. Without lens skin presents waived striate appearance. Dorsal begins before anal, space about equal to $1 \frac{1}{3}$ in head. Caudal $1 \frac{1}{2}$ in snout.

Color in alcohol: dark uniform brownish above. Lower surface of head and belly pale brown. Fins dark brown, like back, Iris brown. Length 369 mm. Though without locality

17 Like Günther's figure in Cat. F. Brit. Mus..., vol. 8, 1870, p. 34.

our example is doubtless from some place in Polynesia, where the species is now known to be widely distributed. It differs from Gunther's description in the length of head contained $1 \frac{3}{5}$ in distance of gill-opening from dorsal origin.

Murdeno
Anguilla bicolor (McClelland).

Head $6 \frac{3}{4}$; depth $16 \frac{1}{8}$; snout $5 \frac{1}{8}$ in head from upper jaw tip; gape $3 \frac{1}{6}$; interorbital $6 \frac{1}{5}$; mandible $2 \frac{1}{4}$; pectoral $3 \frac{2}{3}$. Body compressed, combined head and trunk about $1 \frac{1}{6}$ in rest of its length. Head width $2 \frac{7}{8}$ its length, pharynx scarcely swollen. Snout depressed, about long as wide. Eye small, largely superior, 2 in snout. No eyelids. Mouth large, low, gape to hind eye edge. Lips fleshy, broad, especially

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lower. Lower jaw well protruded. Teeth conic, though rather short, uniform, in broad bands in jaws narrowed to rictus. Vomerine band of teeth confluent, little wider than jaw bands. Tongue free. Interorbital scarcely convex to level. Gill-opening slightly longer than snout. Scales usually placed more or less at right angles or in little convergent series, 2 to 4 times long as wide, with about 15 to 30 rather coarse reticulate circuli in longitudinal diameter. Space between dorsal origin and vent equals snout. Caudal equals interorbital width.

Color in alcohol: largely uniform dull-brownish. Iris slaty. Length 263 mm. No data, though likely from the Philippines?.

Two examples from Sumatra, in the Academy, show: Head $7\frac{1}{4}$ to $7\frac{3}{4}$; depth 17 to $17\frac{3}{4}$; snout $5\frac{1}{8}$ to $5\frac{1}{4}$ in head from upper jaw tip; gape $2\frac{2}{3}$ to $3\frac{1}{3}$; interorbital $4\frac{4}{5}$ to $6\frac{1}{2}$; pectoral $3\frac{1}{3}$ to 4; caudal $5\frac{1}{2}$ to $6\frac{2}{5}$; eye $1\frac{3}{4}$ to $2\frac{1}{3}$ in snout in larger. Color when fresh in arrack, dark brown on back and upper surface. Belly and lower surface pale brown. Dorsal, caudal and anal dark brown behind, rest of anal pale like color of belly. Pectoral brownish. Lower jaw brownish in front. Length 153 to 365 mm.

~~Murgend~~
Anguilla australis (Richardson). *Fey-40*

Three drawings, 2 with details, from New Zealand and Tahiti. In the last, which is labeled as "fluviatile" the

dorsal and anal are shown with irregular waved oblique dark lines. One New Zealand drawing shows the dorsal origin but slightly in advance of the anal, whereas in the other it is $1\frac{1}{4}$ head lengths. The details show the vomerine teeth in broad band, also lower mandibular teeth, and both broader than maxillary bands.

Muraenesocidae.

Muraenesox cinereus (Forsk.) *Fig. 42.*

Head of a large example without locality. Possibly Agate's painting of an example 4 ft. 2 in., long, obtained August 5, 1860 at Fiji, represents this specimen.

Congridae.

Conger marginatus Valenciennes.

Head $7 \frac{1}{3}$; depth $18 \frac{1}{2}$; snout $3 \frac{4}{5}$ in head; eye $7 \frac{1}{8}$; gape $2 \frac{2}{5}$; interorbital 6; mandible 2; pectoral $2 \frac{7}{8}$. Body well compressed, combined head and trunk 2 in rest of body. Head width $2 \frac{2}{5}$ its length. Snout elongate, conic, width $1 \frac{1}{4}$ its length. Eye large, lateral, center about first third in head, 2 in snout. No eyelids. Gape large, nearly reaches hind eye edge. Lips broad, fleshy, lower wider. Snout protrudes half an eye diameter beyond mandible. Teeth uniserial in jaws laterally, close-set, subequal, rather truncate. Patch of smaller and more conic teeth in front of each jaw and on vomer. Tongue pointed, free. Front nostril in short tube at snout tip. Hind nostril small pore close to front eye edge. Upper lip with 3 pores. Interorbital conic. Gill-opening $1 \frac{1}{4}$ in snout. Dorsal origin about first third of pectoral, height of fin in front about $2 \frac{4}{5}$ in head; height of anal 4. Caudal rather pointed, about $2 \frac{1}{6}$ in snout.

Color in alcohol: uniform faded brownish. Pectoral with blackish blotch on upper apical portion. Length 690mm. Hawai-

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ian Islands.

Four examples in the Academy compared, of which 2 Hawaiian and 2 from Christmas Island in the Pacific. They show: Head $7\frac{1}{2}$ to $8\frac{1}{2}$; depth $15\frac{3}{4}$ to $23\frac{1}{2}$; snout 4 to $4\frac{2}{5}$ in head; eye $5\frac{4}{5}$ to 8; gape $2\frac{1}{3}$ to $2\frac{2}{3}$; interorbital 7 to 9; head width 3 to $3\frac{1}{8}$; pectoral $2\frac{3}{4}$ to $2\frac{3}{5}$; median row of lateral pores 145 to 150 in largest examples. In alcohol usually with back variously paler or darker brown. Lower regions of head a little paler. Edges of vertical fins deeper brown than body color and become still darker behind. Upper outer part of pectoral with large black blotch. Length 171 to 610 mm.

Viternio verrens Snyder. *Fig. 41.*

Drawing from Hawaiian Islands. As the type. No. 50865.

[U. S. N. M., which we have examined, is a mutilated specimen without the end of the tail. The figures by Richardson 1858 show the end of the tail apparently without a caudal, which therefore substantiates Snyder's location of the genus. We are, however, not sure of the dentition of the type, which is alleged to be absent. Our examination reveals a pattern agreeing in most ways with Richardson's detail figure.

Ophichthyidae.

Myrichthys
~~Chloevastes~~ colubrinus (Boddaert). *Fig. 43.*

Head $20\frac{1}{2}$; depth 43; snout 5 in head; gape $3\frac{1}{4}$; interorbital 6; mandible $2\frac{4}{5}$. Body moderately compressed, sides convex. Tail tapers to sharp compressed point. Head and trunk combined $1\frac{1}{10}$ in tail. Head width $3\frac{1}{2}$ its length. Snout conic, about long as wide. Eye small, 4 in snout. No eyelid. Rictus half an eye-diameter beyond eye. Lips entire, wide, fleshy. Lower jaw nearly an eye-diameter shorter than upper. Teeth molar-like, rather irregularly biserial above and on vomer, more regularly biserial in lower jaw. Front of upper jaw with slight loop of molar teeth. No tongue. Front nostril short fleshy tube before mandibular tip. Hind nostril oblique slit in upper lip below front eye edge. Interorbital convex. Gill-opening $1\frac{2}{3}$ in snout. Head and fore part of trunk with many longitudinal wrinkles, little wider on pharynx. Dorsal origin nearer snout tip than gill-opening by space equal to snout, fin elevated at origin. Anal little lower than dorsal. Pectoral short, broad, rudimentary, base over twice its length.

Color in alcohol: generally pale uniform brown. Body with

36 dark brown transverse bars, wider above than below, or about 3 times wide as interspaces and below about 4 to 5 times wide as interspaces, also extending on vertical fins. Dark round blotch in each pale area above, another below, though these sometimes fused, especially on tail. Edges or outer portions of fins also with rounded dark brown blotch between each dark vertical bar. On head first dark bar at end of snout, second includes eye and third little before middle in head. All dark blotches and bands bordered with darker. Length 887 mm. No locality.

^{hlevastes}
C. elaps Fowler¹⁸ is ~~likely~~ a synonym, though its dorsal shows more numerous rays or about 582 compared with about 400 in the above described example. It has more dark vertical bands, compared with 25 for C. elaps. Head $9 \frac{1}{3}$ in trunk in C. colubrinus and $8 \frac{2}{5}$ in C. elaps.

18 Proc. Acad. Nat. Sci. Phila., 1912, p. 13, fig. 3. Philippines.

Drawing of an example from Samoa by John H. Richard.

Myrichthys
~~Chloevastes~~ fasciatus (Ahl). Fig-44.

Head $9 \frac{3}{5}$ to vent, $20 \frac{1}{4}$ to last vertebra; depth 51; snout 5 in head; gape $3 \frac{1}{4}$; interorbital 7; mandible $4 \frac{1}{4}$; Body slightly compressed, sides convex. Tail tapers rather gradually to sharp compressed point. Head and trunk combined $1 \frac{1}{4}$ in tail. Head width $3 \frac{3}{4}$ its length. Snout conic, width $1 \frac{2}{5}$ its length. Eye small, about 4 in snout. No eyelids.

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Rictus $3/4$ an eye-diameter beyond eye. Lips fleshy, with fine papillae inside. Lower jaw $1\frac{1}{2}$ eye-diameter shorter than snout. Teeth molar-like, biserial irregularly in jaws and on vomer. Row of three large molar-like teeth in upper jaw before mandible tip. No tongue. Front nostril short fleshy tube about half of eye, midway in snout end before mandible tip. Hind nostril rather broad oblique slit in upper lip below front part of eye. Interorbital convex. Gill-opening about equals interorbital. Head and fore part of trunk more especially below with many fine longitudinal wrinkles. Dorsal origin nearly at first $2/5$ in head. Anal little lower than dorsal. Pectoral short, low, rudimentary.

Color in alcohol: very pale brownish-white. Body-rings 29, broad, dark brown, each but slightly less than pale interspace and on tail behind pale interspaces little less in width than dark bands. Dark bands also wider below, extend completely around body and over fins. Along front anal edge dark marginal blotch in first few pale interspaces between dark vertical bars. Snout end pale, first dark band includes eye and rictus, and second dark band closer to first than to third. Length 558 mm. Fiji. Also one without data. Quite likely the latter specimen may have been the subject of ^{J.H.} Richardson's drawing in 1858, labeled Samoa, and A. 216.

This species appears to differ from ^MC. colubrinus chiefly in color, the darker bands being broader and the pale interspaces largely if not wholly immaculate. Jordan and

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Seal's figure¹⁹ differs from our material in that the dark bands are evidently incomplete below and obscure on the fins. The alleged smaller head for the present species, compared with ^MC. colubrinus, does not hold.

19 Bull. Bur. Fish., vol. 25, 1905 (1906), p. 195, fig. 5.

Maculosus (Cuvier). *Fig. 44a.*
Myrichthys magnificus (Abbott).

Head $14\frac{1}{4}$; depth $32\frac{1}{3}$; snout $5\frac{1}{8}$ in head; mouth cleft $2\frac{1}{4}$; interorbital $5\frac{1}{3}$; eye $2\frac{1}{4}$ in snout; combined head and trunk $1\frac{1}{4}$ in rest of body; length 405 mm. Fiji. It agrees with the smaller paratype in the Academy. The spots on the head are, however, not evident in the Fiji example.

We also give an account of the types of Pisoodonophis magnifica Abbott, compared in the Academy. The type. No. 1013. A. N. S. P., shows: Head $14\frac{3}{5}$; depth $29\frac{1}{5}$; D. about 466; A. 295; head width $3\frac{2}{3}$ its length; head depth 2; snout $4\frac{4}{5}$; mouth 3; mandible $2\frac{1}{2}$; interorbital 6; pectoral $1\frac{2}{5}$ in snout; eye $2\frac{1}{2}$; head $6\frac{3}{5}$ to anal origin. Body elongate quite slender, subcylindrical or but slightly compressed and more so towards end of gradually tapering tail. Head small, rather compressed, with swollen pharynx and upper profile more convex than lower. Snout conic, surface and profile convex, about long as basal width and tip projects well beyond mandible. Eye ellipsoid, supero-lateral, center at first $\frac{2}{9}$ in head. Mouth moderately small, nearly horizontal, wide, rictus not quite an eye-

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diameter behind eye. Lips thick, fleshy, entire. Teeth rather granular, rounded or molar, large; lateral upper jaw bands not joined in front with premaxillary or vomerine area, irregularly biserial, 2 series more distinct posteriorly and area not extending back much if any beyond hind pupil edge; 5 rather large coarse premaxillary teeth, still visible when mandible is closed, followed by vomerine area of smaller teeth, latter mostly irregularly biserial and extend back well beyond eye; mandible teeth rather regularly biserial, outer series enlarged especially anteriorly though not continuous across symphysis. No tongue. Mandible strong, shallow, rami low. Front nostril in rather large fleshy tube, inferior on upper lip just before mandible tip; hind nostril large slit in upper lip opening down below front eye edge. Interorbital convex. Gill-opening about 2 in snout. Skin smooth, with longitudinal pharyngeal wrinkles, also several behind pectoral. Row of 7 pores along each side of mandible. Lateral line begins on head before pectoral with 9 pores and 165 more to tail tip. Dorsal origin midway between snout tip and gill-opening. Anal slightly lower. Tail tip compressed, firm, sharp. Pectoral 12, broad, rounded.

Color in alcohol: largely whitish in ground-color, back tinged with terra-cotta. About 50 spots of deep brown down back, more or less irregular or alternating in places, all rather large. On head first of superior spots on snout above, afterwards all largely biserial. Below or on sides another series and mostly on tail, still another series inferiorly,

some of the latter approximate along anal base. Dorsal with paler blotches. Anal largely whitish, sometimes dark brown blotches on tail inferiorly reflected basally. Pectoral pale or whitish. Spots on side of head and below, latter mostly small and pale. Mandible with several small brownish spots. Iris pale slaty. Length 686 mm.

Paratype, No. 1013. A. N. S. P., same data, shows: Head $14\frac{1}{4}$; depth 45; head width 3 in its length; head depth $2\frac{1}{4}$; snout $4\frac{1}{2}$; mouth 3; head $5\frac{7}{8}$ to anal; length 407 mm. It has fewer spots than the type though similarly distributed.

A drawing, without data agrees largely with the Wilkes example and also the Ophichthys stypurus Smith and Swain, as figured by Jordan and Evermann. There is a marked difference, however, in that the upper surface of the head is marked with three large dark blotches.

Ophichthys cephalozona (Bleeker). *Fig. 45.*

Head $9\frac{4}{5}$ to $10\frac{3}{4}$; depth $30\frac{4}{5}$ to 37; snout 5 to $5\frac{2}{3}$ in head; gape $3\frac{1}{6}$ to $3\frac{1}{5}$; interorbital $6\frac{1}{5}$ to $7\frac{2}{5}$; mandible $2\frac{2}{5}$ to $2\frac{2}{3}$; pectoral 3 to $3\frac{1}{5}$. Body subcylindrical, combined head and trunk $1\frac{1}{4}$ in tail. Head width 3 to $3\frac{3}{5}$ its length. Snout conic, long as wide. Eye ellipsoid, $1\frac{3}{4}$ to $1\frac{4}{5}$ in snout. No eyelids. Gape extends very slightly beyond hind eye edge. Lips fleshy, rather wide, covered with minute wide-set papillae. Small fleshy point on upper lip about midway in snout length and another below front eye edge.

Upper jaw extends about half an eye-diameter beyond mandible. Pair of rather large canines, followed by small pair, in upper jaw before mandible. Teeth in jaws and on vomer uniserial, first lower pair little enlarged. Fleshy tongue not free. Front nostril in broad fleshy tube close before mandible tip. Hind nostril slit in upper lip close before eye. Interorbital slightly convex. Gill-opening equals interorbital. Four pairs of pores on muzzle above, 4 along upper lip and 2 behind each eye and 3 across occiput. Dorsal begins about over middle of depressed pectoral and like anal with last rays little elevated. Tail end in firm and rather compressed point.

Color in alcohol: largely uniform dull brownish. Hind half of head above and before gill-opening dusky. Dorsal pale brownish basally, blackish medially to very narrow white edge. Anal similar. Pectoral brown. Iris pale slaty. Indistinct broad dark blotch extends from front eye edge well back beyond rictus. Length 468 to 490 mm. Two examples without data, likely from Fiji. This locality is given on our drawing by Richardson 1858.

J. H.

^u
Ophichthys ^mgonesii (Castelnau). ^u Fig. 46.

Head $9\frac{3}{4}$; depth $26\frac{1}{3}$; snout $5\frac{3}{4}$ in head; gape $2\frac{7}{8}$; interorbital 7; mandible $2\frac{1}{2}$; pectoral $2\frac{1}{2}$. Body subcylindrical, combined head and trunk $1\frac{5}{6}$ in tail. Head $3\frac{2}{5}$ to vent, width $3\frac{2}{3}$ its own length. Snout conic, width $1\frac{1}{5}$ its length.

Eye ellipsoid, $1 \frac{2}{3}$ in snout. No eyelids. Gape large, extends about half an eye-diameter beyond eye. Lips rather thin, entire. Upper jaw extends about $\frac{2}{5}$ an eye-diameter beyond mandible. Teeth conic, biserial in jaws and on vomer; front of upper jaw with double row of 6 slightly larger teeth before mandible tip. Front nostril in short broad simple tube in upper lip, at mandible tip. Hind nostril slit in upper lip below front eye edge. Fleshy tongue not free. Interorbital level. Gill-opening $1 \frac{1}{8}$ in snout. Dorsal begins about over last fifth in pectoral. Anal little lower than dorsal. End of tail moderately compressed, slender, last dorsal and anal rays slightly elongate.

Color in alcohol: dull brown. Vertical fins slightly darker or more deeper brown marginally. Length 413 mm. No locality ^{with specimens} Rio Janeiro, according to ^{3s}Richardson's drawing ^{J. H.} in 1858.

We compared an example in the Academy from Colon, 635 mm. long, not 400 mm. as stated by Fowler.²⁰ It shows the nasal tube with a distinct pointed barbel.

²⁰ Proc. Acad. Nat. Sci. Phila., 1917, p. 131.

Ophisurus ^mgomesii Castlenau, is described ²¹ with 3 rows of teeth on the palate. The figure shows the dorsal beginning directly behind the pectoral tip, eye large and the nasal tube simple or without indication of a barbel.

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Ophichthus callaensis Gunther. 754-47.

Head $7\frac{1}{2}$ to 8; depth $19\frac{1}{5}$ to 20; snout $5\frac{1}{5}$ to $6\frac{1}{4}$ in head; gape $2\frac{1}{3}$ to $2\frac{7}{8}$; interorbital $8\frac{1}{2}$ to 10; mandible $2\frac{1}{6}$ to $2\frac{1}{4}$; pectoral $2\frac{1}{4}$ to $2\frac{7}{8}$. Body moderately compressed, combined head and trunk $1\frac{2}{5}$ to $1\frac{3}{5}$ in tail. Head width $3\frac{1}{4}$ to $3\frac{2}{3}$ in its length. Snout conic, length $1\frac{1}{4}$ in its width. Eye elongate, pupil edge about first fourth in head; eye $1\frac{1}{3}$ to $1\frac{1}{2}$ in snout. No eyelids. Gape large, reaches back nearly an eye-diameter beyond eye. Lips moderate. Upper jaw extends about half an eye-diameter beyond lower. Six large canines form angle in front of upper jaw. Jaw teeth biserial, several front ones slightly enlarged below. Row of simple pointed vomerine teeth, front ones little enlarged. Tongue fleshy, not free. Front nostril in short simple tube along upper lip about first third in snout. Hind nostril slit in upper lip close before eye. Interorb-

21 An. Amer. Sud. Poiss., 1855, p. 84, Pl. 44, fig. 2. Rio Janeiro.

ital nearly level. Gill-opening about long as snout, or equal snout with $\frac{2}{3}$ of eye in young. Dorsal begins opposite pectoral tip. Anal little lower than dorsal. End of tail strongly compressed, coriaceous, both dorsal and anal at hind ends slightly elevated or expanded. I

Color in alcohol: uniform brownish largely, slightly paler below. Length 320 to 454 mm. Three examples without

locality.

Our drawing by Richardson 1858, labeled Valparaiso.

Our examples agree largely with the account by Jordan and Davis,²² though they include the species with those alleged to have 2 rows of vomerine teeth.

As compared with O. pacifici (Gunther)., represented by the type of Ophichthys uniserialis Cope²³ in the Academy collection, that species is distinguished by the row of small white spots along the lateral line. The type of O. uniserialis Cope, No. 21,152. A. N. S. P., shows: Head $6\frac{3}{4}$; depth at vent $23\frac{1}{5}$; D. about 250; A. about 160; P. 15; head width $3\frac{1}{3}$ its length; head depth $3\frac{1}{4}$; snout 6; eye $9\frac{1}{3}$; mouth $2\frac{2}{5}$; interorbital $6\frac{4}{5}$; mandible $2\frac{1}{3}$; pectoral 3; head $1\frac{3}{7}$ to dorsal origin; head $2\frac{4}{5}$ to

22 Rep. U. S. Fish Com., vol. 16, 1888 (1892), p. 633.

23 Proc. Amer. Philos. Soc. Phila., vol. 17, 1877, p. 31.
Pecasmayo Bay, Peru.

anal origin; pores about 170 in lateral line, of which first 12 before gill-opening. Body elongate, subcylindrical or moderately compressed, sides convex; tail tapers gradually from vent, tip acuminate. Head moderately compressed, pharynx scarcely swollen, profiles alike, rather conic, depressed, wide as long, tip projects well beyond mandible. Eye ellipsoid, without eyelid, center well advanced. Mouth large, wide, horizontal. Lips entire, fleshy, firm. Teeth conic, sharp-pointed, slightly directed posteriorly, biserial in jaws, not continuous above with premaxillary or

vomerine series. Premaxillary teeth little larger than others, visible below in front of closed mandible and continuous with uniserial vomerine teeth. Mandibular teeth not continuous across symphysis, outer little larger. Tongue thick, fleshy, smooth, not free. Mandible wide, low. Front nostril short tube, close after mandible tip on upper lip. Hind nostril very short tube opening down in upper lip close before eye, front edge little protruded. Interorbital broadly convex. Gill-opening large, nearly verticle, about equal snout, begins above about opposite bases of uppermost pectoral rays. Skin smooth, more or less distinct longitudinal wrinkles, especially on head below and pharynx. Mandible with 6 pores each side, 3 pores behind and 2 below eye and one close after front nasal tube on upper lip; 3 pairs of pores on snout above, all before eyes. Dorsal origin opposite depressed pectoral tip, space between former and gill-opening about $2 \frac{2}{5}$ in head, fin low and continued nearly to tail tip. Anal similar, though much better developed, and like dorsal with well-developed cutaneous basal fold posteriorly. Tail tough and pointed at tip. Pectoral large, broadly expanded. Vent close before anal.

Color in alcohol: largely dull chocolate-brown, slightly paler on abdomen and lower surface of head. Fins pale and uniform brown. Iris brownish. Length 331 mm.

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Ophichthus polyophthalmus Bleeker. 724-48.

Head $11 \frac{2}{5}$; depth $27 \frac{1}{4}$; snout $5 \frac{1}{6}$ in head; gape $2 \frac{7}{8}$; interorbital $6 \frac{3}{4}$; mandible $2 \frac{2}{5}$; pectoral $5 \frac{1}{2}$. Body moderately compressed; tail about $1 \frac{1}{5}$ in combined head and trunk. Head width about 3 in its length. Snout conic, depressed, wide as long. Eye elongate, center near first fourth in head; eye 2 in snout. No eyelids. Gape long, reaches back half an eye-diameter at least beyond eye. Lips moderate. Upper jaw extends about an eye-diameter beyond lower. Four large canines in front above. Jaw teeth uniserial. First pair of lower teeth slightly enlarged. Single row of small teeth on vomer, first tooth largest. Tongue fleshy, not free. Front nostril in fleshy tube nearly long as pupil, near snout end. Hind nostril slit in upper lip about midway in snout length. Interorbital nearly level. Gill-opening $1 \frac{1}{2}$ in snout. Dorsal begins close behind pectoral origin, fin height about equals gape. Anal much lower than dorsal. Tail ends in firm slender point.

Color in alcohol: with about 18 dark brown obscurely defined close-set pairs of rings, each with small pale or whitish center down back next to dorsal fin. Alternating along each side above, row of similar but larger rings, these embracing most of space above lateral line. Alternating along l. l. row of similar dark rings. Below l. l. still another row of similar rings, but these opposite upper laterals. On tail beneath row of dark rings, separated only by anal fin and on tail behind rings fuse and become broad. Dorsal with partly basal row of dark-edged ocelli, alternate

with nearest row on back. Row of median obscure blotches, mostly elongate and fin edge dark. Anal pale, without marks. Head with many small pale spots, bordered by deep brown or dusky. Pectoral brown, with several pale spots. Iris slaty. Length 690 mm.

Our drawing is by Richardson 1858, and is labeled "Sandwich Islands." It differs slightly from Bleeker's figure²⁴ in the dark markings on the dorsal fin appearing more as spots. The species has not previously been reported from the Hawaiian Islands

24 Atlas Ich., 4, 1864, p. 47, Pl. 42, fig. 3.

Echidnidae
~~Muraenidae~~
Echidninae

Murenophis

~~Muraena~~ pardalis (Schlegel). *Fig. 49.*

Head $6 \frac{2}{3}$; depth $12 \frac{1}{2}$; snout $4 \frac{2}{5}$ in head; gape $2 \frac{1}{6}$; interorbital $7 \frac{4}{5}$; mandible $1 \frac{3}{5}$. Body well compressed, combined head and trunk $1 \frac{1}{3}$ in tail. Head acuminate, well compressed, width 4 in its length. Snout conic, width $1 \frac{3}{4}$ its length. Eye with hind edge about first third in head, $1 \frac{3}{4}$ in snout. Mouth not capable of completely closing, upper jaw slightly longer. Teeth exposed, mostly uniserial in jaws, simple, conic, variously short or long, or alternate; 3 large depressible teeth on vomer and inside 5 below each eye; 5 smaller erect teeth at same point medially on mouth roof. Front nostril in short simple tube at snout tip,

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about half of eye in length; hind nostril in simple tube about $1/3$ longer than front one, over front third of eye. Gill-opening little below middle in depth, about $2/3$ of eye. Pair of pores on snout above nearer tip than eye; 4 pores along each side above and below. Dorsal origin about last third between eye and gill-opening. Caudal long as eye.

Color in alcohol: dark sepia brown generally. Sides with 3 rows of longitudinally blackish rounded blotches, in about 25 series, not greatly larger than eye. On belly and below these joined by blackish transverse line or by fellow. On head these form 3 black transverse bands, first near mandible tip, second below eye and third at rictus. Most everywhere paler to whitish blotches between blackish blotches, but smaller on body posteriorly. Dorsal and anal fins pale brown with blackish marginal blotches, about twice as numerous as those on trunk. Length 230 mm. One example without locality, likely from Polynesia?.

Günther includes ^{urgend} M. [^]kailuae Jordan and Evermann, and M. lampra Jenkins., as synonyms.²⁵ In coloration the markings are more regular on our example than in any of the published figures.

25 Journ. Mus. Godeffroy, vol. 17, 1910, p. 408.

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^{enophtis}
Muraena pavonina (Richardson).

Head 7; depth $12 \frac{1}{6}$; snout 5 in head; gape $2 \frac{1}{4}$; inter-orbital 7; mandible $1 \frac{2}{3}$. Body well compressed; tail $1 \frac{1}{10}$ in combined head and trunk length. Snout conic, width about $1 \frac{1}{8}$ in its length. Eye with hind edge about first third in head, $1 \frac{1}{2}$ in snout. Mouth completely closing. Jaws even. Teeth mostly uniserial in jaws, simple, conic, enlarged in front and laterals largely uniformly small; row of 3 large depressible fang-like teeth on front of vomer, followed by row of smaller ones; above an inner row of 7 large depressible subequal teeth, first begins below front eye edge and last well behind eye. Front nostril short simple tube close to snout tip, about half length of pupil; hind nostril similar, little longer, above front third of eye within inter-orbital. Gill-opening little below middle in depth, also little shorter than eye. Pair of pores on snout, little nearer snout tip than eye; 4 upper pores along each side of mouth, and 5 below each side. Dorsal origin near first fourth in space between rictus and gill-opening. Caudal slightly less than eye.

Color in alcohol: largely uniform dull brownish. Body everywhere with distinct pale or light brown rounded or ellipsoid spots, most numerous on back, but larger and with narrower dark interspaces below and posteriorly. On head spots quite smaller, so that at least 5 pale ones along lower lip. Gill-opening in dark color of reticulations, also mouth corner. Length 220 mm. No locality.

The above example bears a label with evidently en-

aneous inscription of "Cape Verde Islands" as it was more likely obtained in Polynesia. Compared with the Atlantic M. melanotus (Kaup) it differs in the tail being slightly shorter than the combined head and trunk.

Lycodontis
Gymnothorax meleagris (Shaw). *Fig. 50.*

Head $5 \frac{7}{8}$ to $7 \frac{3}{4}$; depth 10 to 15; snout $4 \frac{3}{4}$ to $6 \frac{1}{2}$ in head; gape $2 \frac{1}{4}$ to $2 \frac{3}{4}$; interorbital $5 \frac{5}{4}$ to $7 \frac{1}{2}$; mandible $1 \frac{3}{4}$ to $2 \frac{1}{8}$. Body strongly compressed, tail about $1 \frac{1}{5}$ to $1 \frac{1}{6}$ in combined head and trunk (tail slightly damaged). Head width $2 \frac{3}{5}$ to $3 \frac{1}{2}$ in its length. Snout conic, width 1 to $1 \frac{1}{6}$ in its length. Eye about midway in gape, center about first fourth in head; eye $1 \frac{2}{3}$ to $1 \frac{7}{8}$ in snout. Mouth not completely closing, exposes teeth. Lower jaw slightly shorter than upper. Upper teeth irregularly biserial along sides, often with very slight deviation from uniserial; lower teeth uniserial; 6 large depressible conic canines in front of mouth above and single row of short blunt median vomerine teeth below and behind eye; upper jaw laterally with row of 6 to 9 larger depressible teeth inside outer series. Front nostril in short tube near snout tip and hind nostril small pore above front eye edge. Interorbital slightly convex. Gill-opening about $1 \frac{2}{5}$ in eye. Pores on muzzle inconspicuous. Dorsal begins about midway between rictus and gill-opening, or more advanced.

Color in alcohol: deep brown, mottled everywhere with

rather fine markings of darker and dusky, also many small pale brownish spots, others blackish. On lower surface of head and pharynx mottlings very fine, as dark specks. Length 245 to 325 mm. One without locality and the other from Fiji.

Günther united Thyrsoidea eurosta Abbott and Lycodontis parvibranchialis Fowler, with this species. After a re-examination of the types of these two nominal forms and comparison with the above, we are forced to conclude all are the same. Gunther also includes as other synonyms, evidently correctly, Muraena laysana Steindachner, Gymnothorax ercodes Jenkins and G. leucostictus Jenkins.

Thyrsoidea eurosta Abbott, type No. 984, A. N. S. P., was obtained in the Hawaiian Islands by Dr. J. K. Townsend. It shows: Head about 7; depth $12\frac{1}{2}$; snout $5\frac{4}{5}$ in head; gape 2; mandible $1\frac{3}{4}$; interorbital 7. Combined head and trunk about $1\frac{1}{10}$ in tail. Head width $2\frac{4}{5}$ its length; pharynx scarcely swollen. Snout conic, slightly arched, width $1\frac{1}{5}$ its length. Eye little nearer snout tip than rictus, 2 in snout. Mouth not closing completely. Vomer with an irregular or partly double series of short and rather obtuse molar-like teeth. Dorsal inserted about midway between front eye edge and gill-opening.

Color in alcohol: rich brown, dark in shade, very finely mottled with pale brown and about 6 rows of dusky or blackish longitudinal blotches, so whole appearance is finely marbled. Fins like body. Iris grayish. Inside mouth mottled

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finely with brownish. Rictus brown. Gill-opening not darker than adjoining region. Length 343 mm. This nominal form shows an altogether more finely mottled type of coloration than the first example noted above. Also the dentition varies, as the upper outer lateral teeth are quite regular and the large inner depressible ones are 10 or 11, besides the slightly biserial vomerine row. Gunther expressly says²⁶ "the teeth are biserial except those on the vomer."

The type of Lycodontis parvibranchialis Fowler, No. 16, 483. A. N. S. P., was also obtained in the Hawaiian Islands. It shows: Head $7 \frac{3}{5}$; depth at vent 17; snout 5 in head; eye $6 \frac{1}{2}$; gape $2 \frac{1}{8}$; interorbital $6 \frac{1}{5}$. Head width $3 \frac{3}{5}$ its length. Snout trifle longer than wide. Eye little nearer rictus than snout tip. Mouth not completely closing. An outer

26 Cat. Fishes Brit. Mus., vol, 8, 1870, p. 100.

series of erect teeth in each jaw, subequal, irregularly biserial behind front of eye; above well before eye 3 longitudinal rows of 3 or 4 teeth, enlarged, conic, slightly barbed, depressible; row of enlarged depressible teeth inside each side of upper jaw beginning at eye front and extending far back as upper laterals; vomerine teeth begin also opposite eye front, short, conic, subequal; below 3 pairs of large depressible teeth in front. Dorsal united at last third between hind eye edge and gill-opening.

Color in alcohol: largely deep warm brown, with 6 irregular longitudinal spots about equal to pupil, none large. Interspaced over body between pale spots many large ill-defined

dusky blotches equally numerous. Pale spots also extend on fins and submarginal regions dusky. Mouth angle not dark. Gill-openings dusky. Iris pale slaty. Length 119 mm. Undoubtedly similar to the nominal Muraena laysanus Steindachner.

Two other examples in the Academy, without data, though probably Hawaiian, show: Head $7\frac{1}{2}$; depth $12\frac{2}{3}$ to $14\frac{3}{4}$; snout $5\frac{4}{5}$ in head; eye 9 to $9\frac{1}{2}$; gape $7\frac{3}{4}$ to $9\frac{1}{5}$; head $3\frac{1}{5}$ to $3\frac{1}{4}$ to vent; Length 217 to 280 mm. The coloration has largely disappeared though sufficient remains to show agreement with Steindachner's account.

Lycodontis

Gymnothorax ^astellatus (Lacépède). *Fig. 51.*

Head $5\frac{4}{5}$ to $8\frac{1}{8}$; depth $12\frac{1}{3}$ to $22\frac{1}{2}$; snout 5 to 6 in head; gape 2 to $2\frac{2}{5}$; interorbital 7 to $9\frac{7}{8}$; mandible $1\frac{2}{5}$ to $1\frac{4}{5}$. Body well compressed, combined head and trunk $1\frac{1}{6}$ to $1\frac{1}{3}$ in tail. Head attenuate, width $3\frac{1}{3}$ to 4 in its length. Snout conic, width $1\frac{1}{4}$ to $1\frac{1}{2}$ its length. Eye little ellipsoid, little behind middle in gape, sometimes nearer snout tip, or near first fourth in head; $1\frac{2}{3}$ to 2 in snout. Mouth large, closes or not completely. Jaws nearly even, sometimes mandible slightly protrudes. Teeth uniserial in jaws and on vomer, and in front of each several enlarged; vomerine teeth with front ones well separated from uniform smaller ones, sometimes biserial in front though rarely for entire extent; below eye front 1 to 3 inner teeth each side but slightly larger than outer, some-

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times absent. Front nostril in short fleshy tube each side of snout tip; hind nostril small pore above eye front within interorbital. Interorbital little convex. Gill-opening usually little less than eye, little inclined. Dorsal begins on head, close after rictus or sometimes midway between rictus and hind eye edge.

When fresh in arrack Sumatran examples were dull purplish brown, belly and lower surface paler. Sides, upper portions and tail with large dull blackish spots or blotches, clearly defined. Most spots about size of eye, smaller on sides, where arranged to form irregular vertical series, also extending on vertical fins. Latter with narrow whitish edge and submarginal dusky one close below. Head above and on sides marked with dusky spots, arranged somewhat in streaks converging towards snout tip, where also much narrower. Mandible and head below pale, immaculate. Iris dull slaty. Dusky blotch in each mouth corner. Lower lip and inside mouth, also gill-opening, pale.

Hawaiian examples are rich brownish, in alcohol, variable. Numerous pale or creamy reticulating lines forming 3 lateral series extending for entire body length, and made up of broken spots of ground-color. Narrow lines also more or less thickly speckled with ground-color, also to form about 3 longitudinal rows of spots on dorsal, similar to those on trunk. Abdomen and head below paler than sides, markings pale or absent. End of tail cream-white. Gill-opening edged with dusky. Mouth corners dusky. Inside mouth mottled with dark brown. One example with body almost everywhere speck-

led or finely reticulated with whitish.

An example from Fiji is very similar to Day's figure of Muraena fimbriata, especially its coloration, though its spots are a trifle larger.

Seven examples 225 to 840 mm., of which 2 from Fiji and one Hawaiian, the others without data. We also include a series from Sumatra, Samoa and the Hawaiian Islands in the Academy, besides the types of Thyrsoidea kaupi Abbott and Muraena acutirostris Abbott.

The type of M. acutirostris Abbott. No. 998 A. N. S. P., is undoubtedly a variant of the present species, as contended by Gunther. It shows: Head $7 \frac{7}{8}$; depth $21 \frac{2}{3}$; snout $5 \frac{3}{5}$; mouth $2 \frac{1}{4}$; interorbital $11 \frac{1}{4}$. Head and trunk combined $1 \frac{1}{16}$ in tail; head $3 \frac{1}{3}$ to vent; head width $4 \frac{1}{2}$ its length. Muzzle long, acuminate; snout conic, width $1 \frac{7}{8}$ its length. Eye about midway in gape, 2 in snout. Mouth not closing, upper jaw edge nearly straight, lower concave. Upper jaw slightly protrudes. Teeth largely uniserial, enlarged and nearly erect in front; about 5 pairs of canines, last pair below front eye edge, first, third and fifth pairs erect, others depressible inward; median row of 4 enlarged conic depressible canines, first smallest and at snout tip; mandibular teeth mostly uniform, entire, well inclined back, gradually increase in size from after front enlarged canines to rictus; row of small and rather compressed close-set vomerine teeth. Hind nostril short horizontal slit above front eye edge, length little less than $\frac{1}{4}$ of eye. Dorsal origin about midway between rictus and gill-opening.

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Color in alcohol: deep brown generally, everywhere rather conspicuously marbled with more or less narrow creamy or pale brownish reticulations. Iris pale slaty. Inside mouth mottled brownish, corners not especially darker. Gill-opening slightly edged dusky-brown. Length 587 mm.

The type of Thyrsoidea kaupii Abbott, No. 916 A. N. S. P., shows: Head 8; depth 16; snout 5; gape 2; interorbital $8\frac{3}{4}$; mandible $1\frac{4}{5}$. Head and trunk combined $1\frac{1}{6}$ in tail; head $3\frac{1}{2}$ to vent, width 3 in its length. Snout rather conic, width $1\frac{1}{2}$ its length, slightly protrudes. Eye midway in gape, $1\frac{9}{4}$ in snout. Mouth not completely closing. Teeth uniserial above, front ones canines, also 3 median front canines; 2 large depressible conic teeth close inside outer erect teeth below eye above; lower teeth uniserial, front ones enlarged canines; vomerine teeth uniserial erect teeth, begin opposite front eye edge. Hind nostril simple pore over front eye edge. Gill-opening little less than eye. Pores on head distinct. Dorsal begins about last third between hind eye edge and gill-opening.

Color in alcohol: bright brown, with triple row of rather large blotches whole body length, due to pale or whitish reticulations over ground color. Dark spots not separated along abdomen, where general color much paler than above. All pale reticulated lines of back slope up behind on dorsal fins, also indistinctly extend on anal. Dorsal edge blackish, though anal quite pale. Mouth mottled brownish inside, also rictus little brownish. Gill-opening edged very slightly dark-

er brown than ground color. Iris pale slaty. Tail tip narrowly whitish. Length 407 mm.

Günther united Muraena fimbriata Bennett, M. bullata Richardson and M. isingleenoides Bleeker, after an examination of the types. He also includes M. stellata Lacepede as a synonym of the latter Muraenophis undulata Lacepede. Though the last-named has gained usage for the present species it must be suppressed on account of priority. Of M. undulata Lacepede the color is said to be yellowish to whitish, above the snout level bluish, with 2 longitudinal irregular rows of purplish-black spots on each side, these about 20 in each series. The jaw teeth are curved and close-set, forming 2 rows of similar teeth each side of palate. Lacepede's example was evidently about 350 mm. long.

Lycodontis picta (Ahl).

Gymnothorax punctatus (Schneider). Fig. 52.

Head 7 to $7\frac{3}{4}$; depth $12\frac{1}{3}$ to 16; snout $5\frac{1}{2}$ to 6 in head; gape $2\frac{1}{6}$ to $2\frac{3}{5}$; interorbital $7\frac{1}{2}$ to 8; mandible 2 to $2\frac{1}{8}$. Body compressed, combined head and trunk $1\frac{1}{10}$ to $1\frac{2}{5}$ in tail. Head width $2\frac{7}{8}$ to $4\frac{1}{3}$ its length. Snout conic, width $1\frac{1}{6}$ to $1\frac{1}{2}$ its length. Eye about midway in gape, hind edge about first fourth in head. Mouth not completely closing, lower jaw slightly shorter. Teeth uniserial, front ones enlarged; sometimes 2 depressible teeth inside outer upper row below eye front, but larger than outer; a v shaped patch of molar-like teeth on vomer. Front nostril in short

tube near snout tip; hind nostril pore above and little before front eye edge. Interorbital convex. Gill-opening $\frac{3}{4}$ of eye. Dorsal origin slightly before gill-opening.

Color in alcohol: brown, very finely specked or dotted with deeper. Spots slightly larger and more sparse on lower sides and disappear altogether below or on under surface. Fins finely dotted like body. Iris pale brown. Length 228 to 505 mm. Two from Fiji and one without locality. Richardson's drawing is labeled as Pomotu, and may refer to the last. Another figure, without data, shows the detail drawing with but a single row of small conic teeth.

Also two small examples, without locality, 117 to 125 mm. appear to be young. Though to great extent faded, the larger clearly shows the finely specked or dotted color-pattern of the adults. Though without available material for comparison there is little doubt that our larger examples are identical with the nominal G. nuttingi Snyder, admitted a synonym by Gunther.²⁷ G. goldsboroughi Jordan and Evermann is likewise included. From the former of these two nominal forms our examples differ slightly in not having dark gill-openings.

A drawing by J. H. Richard is labeled "Pomota".

27 Journ. Mus. Godeffroy, vol. 17, 1910, p. 418.

Lycodontis

Gymnotherax petelli (Bleeker). Fig. 53.

Painting without data. It differs from Bleeker's figure in having a broad preorbital black transverse band, and a much narrower inclined one from above eye joining first dark

(11)
A color sketch by J. Draxton of an adult over 3 feet long from Billingshausen Island, September 30, 1839. I have sketch also says "one other caught measured 4 1/2 feet."

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band before dorsal. ^{J.H.} Richardson's ⁱⁿ figure 1858 from an example obtained at Fiji.

Lycodontis ^{ina}
Gymnothorax anatus (Lowe). Fig. 54.

Drawing of small example from Cape Verde Islands. Some of the larger pale blotches shown at least 3 times size of eye.

Lycodontis ^a
Gymnothorax ocellatus (Agassiz). Fig. 55.

Head $7\frac{1}{4}$ to $8\frac{1}{2}$; depth at vent $15\frac{4}{5}$ to $22\frac{1}{3}$; snout 5 in head; eye 8 to $9\frac{1}{2}$; gape $2\frac{1}{2}$ to $2\frac{4}{5}$; interorbital $6\frac{1}{2}$ to 8; mandible $1\frac{5}{6}$ to $2\frac{1}{5}$. Body well compressed, combined head and trunk $1\frac{1}{8}$ to $1\frac{1}{5}$ in tail, latter rather slenderly acuminate. Head width $3\frac{1}{3}$ to $3\frac{1}{2}$ its length, pharynx rather swollen. Snout width 1 to $1\frac{1}{8}$ its length. Eye with front edge or front pupil edge about midway in gape, $1\frac{2}{5}$ to $1\frac{2}{3}$ in snout. Mouth completely closes. Jaws nearly even or lower slightly shorter. Lips rather thin, minutely papillose. Teeth minutely serrated, compressed, uniserial, inclined back, front ones canine-like; median front canines and 2 pairs at front depressible inwards above, all erect below; vomer with median row of small conic teeth beginning below front eye edge. Front nostril simple pore near snout tip; hind nostril simple pore well elevated in interorbital above front pupil edge. Interorbital convex.

Gill-opening $1 \frac{1}{3}$ to 2 in eye. Dorsal inserted about last $\frac{2}{5}$ in space between hind eye edge and gill-opening.

Color in alcohol: largely rich brown, marked very obscurely with dusky. many small buff or creamy spots on trunk in about 6 or 7 longitudinal series and on tail gradually decreasing until terminally only 2 or 3 alternate dark and pale large blotches. Body spots, except on tail end, smaller than interspaces and none much larger than pupil. On head spots not more crowded than on pharynx, though equally small. Eye rim dark brown, also gill-opening. Dorsal with number of rather large blackish marginal blotches, this more or less alternated on lower part of fin with larger or paler blotches. Anal broadly and entirely edged with blackish. Iris grayish. Mouth pale inside. Length 453 mm.

Besides the Wilkes example, without locality though doubtless obtained at Rio Janeiro, we also include an example from Santo Domingo, 420 mm. long, in the Academy. It agrees largely with the figure by Agassiz.²⁸ He shows the white spots of uneven size, some large as pupil and others smaller, dorsal and anal edges with many various white spots of which some small and others much larger than eye and black interspaces often equally large.

²⁸ Pisc. Brasil. Spix. 1828, p. 91, Pl. 50b.

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Echidna zebra (Shaw). 754-56-

Head 10 to $11\frac{3}{5}$; depth 15 to $15\frac{1}{2}$; snout $6\frac{1}{2}$ to $6\frac{3}{4}$ in head; gape $2\frac{3}{5}$ to $2\frac{3}{4}$; interorbital $4\frac{2}{5}$ to $6\frac{3}{4}$. Body moderately compressed; tail 2 in combined head and trunk. Head width 2 to 3 in its length, occipital region quite swollen convexly. Snout obtuse, length 1 to $1\frac{1}{2}$ its width. Eye about midway in gape, $1\frac{1}{4}$ in snout. Lips quite thick, soft or fleshy, smooth. Teeth molars, upper median in hour-glass like area, only vomerine or hind portion longer; this median area of rather large broad rounded molars, with somewhat flattened surfaces, and some small teeth scattered irregularly along edges; above separated from vomerine teeth, below eye short row of small irregular biserial molars on each side; mandibulars like vomerine row, in about 4 slightly irregular rows, most of 2 inner rows much larger than outer. Mouth closes completely, horizontal, though only symphyseal teeth in opposition with maxillary; lower jaw slightly shorter. Front nostril in short tube little nearer snout tip than eye; hind nostril in slight cutaneous tube, its length about half of front nasal tube, above and little before eye. Interorbital greatly convex, declivous. Gill-opening about long as eye. Dorsal obsolete, begins behind vent, thick. Anal less developed.

Color in alcohol: deep dusky brown or nearly blackish, transversely barred with many narrow sharply and evenly defined white cross-bars, many meeting completely. Cross-bars usually little narrower on back, ground color at edges narrowly darker, though slightly wider on belly and abdomen,

none ever wider than eye-diameter. Both dorsal and anal traversed by white cross-bars of trunk. Iris gray. Inside mouth pale or whitish, also mouth-corners and gill-opening.

Length 383 mm. Samoa. Also one in the Academy from ~~the Muscat~~ ^{Cove, Arabia} ~~Philippines~~, 743 mm. included above. It has 98 cross-bars of which 66 meet completely, while the Samoan example has only 55 cross-bars with 38 meeting.

Gymnomuraena fasciata Kaup, said to be the type of Muraena molendinaris Bennett, simply renamed, and be 1270 mm. long, was obtained at Mauritius, and has 100 to 114 cross-bars, Jordan and Evermann figure a Hawaiian example 789 mm. long, showing about 91 rings.²⁹

29 Bull. U. S. Fish Comm. vol. 23, pt. 1, 1903, p. 106, Pl. 20.

Echidna polyzona (Richardson). *Fig. 57.*
^{and} Drawing of ^sExample, without data.
[^] details of head:

Echidna nebulosa (Ahl). *Fig. 58.*

Head $8\frac{1}{2}$ to $10\frac{1}{8}$; depth $14\frac{1}{5}$ to $18\frac{2}{3}$; snout $5\frac{1}{3}$ to 7 in head; gape $2\frac{2}{3}$ to $3\frac{1}{6}$; interorbital $6\frac{1}{8}$ to 8. Body moderately compressed, tail tapering and combined head and trunk very slightly less than tail. Head width $2\frac{3}{5}$ to $3\frac{1}{8}$ its length. Snout rather obtuse, about long as wide. Eye with front pupil edge about midway in gape; $1\frac{1}{2}$ in snout.

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Mouth not completely closing. Lower jaw slightly shorter. Lips fleshy, finely papillose. Teeth robust, entire, upper before eye large, compressed, uniserial around jaw edge, without median series; vomerine teeth large, low, molar, close-set, disposed in rather narrow V shaped pattern; below eye short row of small close-set molars above, extending back well behind eye; sometimes 1 or 2 enlarged median upper conic erect strong teeth anterior to eyes; mandible teeth molar, mostly uniserial, except in front, where also an enlarged inner row of several pairs back from symphysis. Front nostril in short tube each side of snout tip, $2\frac{1}{2}$ in eye; hind nostril much smaller, with slight cutaneous rim, over front eye edge. Interorbital convex, slight median depression behind. Gill-opening about equals eye. Dorsal inserted about last $1/3$ to $2/5$ between rictus and gill-opening.

Color in alcohol: pale ochraceous generally, finely dotted or speckled with dusky or blackish. Along back, including dorsal fin, about 26 blackish blotches, these all spotted, at least medially, with some small irregular ochraceous specks. Though dark saddles extend on back and many to dorsal edge, none reach median axis of trunk. Along lower side of trunk also similar blotches, these alternating on trunk and becoming opposite on lower side of tail. On fore part of tail alternating blackish blotches at first, soon obsolete a little after half its extent. Sides of abdomen with blackish blotches down on belly, though not joining and black below. Anal and caudal broadly and entirely margin-

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ed creamy-white. Transverse blackish band down close behind eye narrowly followed by similar though much broader one close behind. Both these bands mottled with ochraceous, though usually complete below, incomplete in young. Iris yellowish. Mouth corners mottled with blackish. Gill-opening in middle of blackish blotch. Muzzle pale brownish, also inside mouth. Length 150 to 288 mm. Four examples without locality. According to the original drawings one labeled Fiji. We also include 5 examples from Samoa and Hawaii, 235 to 610 mm. long, in the Academy.

Uropterygiinae.

Uropterygius marmoratus (Lacepede).

Fig. 59.

Head $11\frac{1}{4}$ depth $18\frac{1}{3}$ to $21\frac{2}{3}$; snout $6\frac{1}{5}$ to $7\frac{1}{2}$ in head measured from upper jaw tip; gape $2\frac{2}{5}$ to $2\frac{4}{5}$; interorbital $7\frac{1}{4}$ to $7\frac{1}{2}$. Body well compressed, combined head and trunk $1\frac{1}{6}$ to $1\frac{1}{3}$ in tail. Head well compressed, width 3 to $3\frac{3}{4}$ in its length. Snout conic, long as wide. Eye small, $1\frac{3}{4}$ in snout, hind pupil edge midway in gape. Mouth completely closes, lower jaw very slightly protruding. Each jaw with single row of small firm subequal outer teeth; inside second row of longer depressible teeth and also a third row of still longer depressible ones; front of upper jaw with a few large depressible teeth; vomer with Y shaped patch of small teeth; in young but 2 rows of teeth in jaws and 1 row on vomer. Front nostril in short tube near snout tip, but level with middle of eye; hind nostril in short tube directly above front pupil edge within interorbital. Interorbital convexly

elevated. Gill-opening about $2/3$ in snout length. Pores on head small. No fins. Tail compressed and tip rounded.

Color in alcohol: dark brown, finely mottled or marbled with paler or lighter. Under surface with fewer and fainter markings. Iris pale or whitish. The smaller example varies in color only in the coarser and fewer marblings and its lower surface, including mandible, largely plain. One without data and the other from Fiji. Richardson's figure in 1858, shows dorsal fold or keel, hardly a fin?.

Uropterygius tigrinus (Lesson).

Head $7\frac{3}{4}$; depth 22; snout 7 in head; gape $3\frac{1}{5}$; inter-orbital 7; mandibular $2\frac{1}{4}$. Body compressed, vent not clearly evident though tail slightly less than combined head and trunk. Head width $5\frac{1}{6}$ its length. Snout rather obtuse, about long as wide. Eye rather large, elevated, nearer upper profile than lip, 3 in snout. Gape rather large, eye about midway in its length. Lower jaw little shorter. Lips firm. Outer row of fine uniform erect pointed teeth in each jaw and inside a series of larger depressible ones extending equally far back above and below; several rather large depressible teeth in front above; vomer with median row of small teeth. Front nostril in short tube near snout tip; hind nostril simple pore in interorbital over eye center. Inter-orbital slightly convex. Gill-opening small inconspicuous pore, low, no fins, end of tail compressed.

Color in alcohol: dull cinnamon-brown, showing traces of variable large and small irregular blackish or dusky blotches. Length 133 mm. No locality, though doubtless from Polynesia.

It appears^a to agree best with Ichthyophis tigrinus^{US} Lesson,³⁰ in its irregular dark variable blotches. The nominal genus Scuticaria Jordan and Snyder, following the argument of Kendall and Goldsborough,³¹ is suppressed.

³⁰ Voy. Coquille, Zool., 2, 1830, p. 129, Pl. 12.
Society Islands.

³¹ Mem. Mus. Comp. Zool., 26, no. 7, 1911, p. 249.

Uropterygius fijiensis Fowler and Bean.
Uropterygius fijiensis Fowler and Bean,
Proc. U. S. Nat. Mus., 63, 1923, p. 9. Fiji.

Characidae.

Bryconamericus peruanus (Muller & Troschel). *Fig. 39*

Head $3\frac{2}{3}$ to 4; depth $2\frac{3}{4}$ to 3; D. ii, 8, 1, branched rays rarely 9; A.iii, 26, 1, branched rays rarely 25; scales in lateral line 34 to 37 to caudal base and 4? more on latter; 7 scales above l. l. to dorsal origin, 6 or 7 below to anal origin; 16 to 18 predorsal scales; snout 4 to $4\frac{1}{5}$ in head from upper jaw tip; eye $3\frac{1}{5}$ to $4\frac{1}{8}$; maxillary $2\frac{1}{5}$ to $2\frac{1}{3}$; interorbital $2\frac{2}{5}$ to 3.

Body elongate, well compressed. Head width $1\frac{3}{5}$ to 2 in its length. Snout width $\frac{3}{5}$ its length. Eye small, hind edge about midway in head length. Mouth with short inclined gap, mandible protruding. Inner premaxillary teeth 5, outer 4, each side. Maxillary nearly vertical to front eye edge, terminal half free from preorbital and 3 small inner teeth. Mandible with 4 large teeth each side in front followed sud-

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denly by several short postero-laterals. Nostrils nearly level with upper eye edge. Interorbital convex. Broad infraorbital on cheeks wider than eye, touches preopercle edge below but not behind. Postorbital width about $\frac{3}{5}$ of eye, Gill-rakers 9 - 11, lanceolate, about half of filaments, latter $1\frac{1}{3}$ in eye. Scales with apical marginal striae becoming more numerous with age, 16 to 30; basal circuli rather fine. Dorsal origin about midway between front nostril and caudal base, depressed fin slightly less than half way to latter. Small adipose fin little nearer caudal base than depressed dorsal tip, about midway in smaller examples. Anal origin opposite last third of dorsal base, front rays moderate and with basal scales. Pectoral $\frac{7}{8}$ to ventral, latter inserted well before dorsal and not quite reaching anal. In alcohol: uniform brownish, sides and below paler or brassy. Humeral and caudal dark spots, if present, not visible now. Length 78 to 105 mm.

Five examples from Rio Rimac, Lima, Peru. According to the figures.

Compared with larger examples of A. rutilus (Jenyns) from Rio Grande do Sul, latter has much larger eye and narrower infraorbital, which does not touch preopercle ridge. Jenyns figure¹⁶ also shows the same discrepancies, besides the anal beginning clearly behind the dorsal base.

16 Voy. Beagle Zool. 1842, Pl. 23, figs. 2-2a.

Astyanax aeneus (Gunther).

Head 4; depth $2 \frac{2}{5}$; D. ii, 8; A. iii, 24?; scales 33 in lateral line to caudal base and 2? more on latter; 7 scales above 1. 1., 6 below; 15 predorsal scales; snout $3 \frac{3}{4}$ in head; eye $2 \frac{4}{5}$; maxillary $2 \frac{2}{5}$; interorbital $2 \frac{3}{4}$.

Body compressed, also caudal peduncle. Head width half its length. Snout convex, length about half its width. Eye large, hind pupil edge about midway in head length. Mouth with short gape. Jaws about even. Maxillary slightly beyond eye front, apparently toothless. Inner premaxillary teeth 5 and 4 externally each side. Infraorbital width $\frac{2}{3}$ of eye, narrow strip of skin separating preopercle ridge. Gill-rakers 7 - 11, lanceolate, about $\frac{3}{5}$ of filaments and latter $1 \frac{1}{2}$ in eye. Scales with 8 to 11 apical marginal striae; basal circuli moderately fine. Dorsal origin about midway between snout tip and caudal base. Anal begins below hind part of dorsal base. Ventral inserted well before dorsal origin and apparently (damaged) not reaching anal. Color in alcohol; dull brown, with obscure brassy band along middle of side, about wide as eye. Dull dusky humeral blotch, little smaller than eye, just above origin of lateral line. Length 60 mm. (without caudal). No locality, though likely from Rio Janeiro?.

Compared with examples in the Academy from Guzman, Guatemala, about same size, the above has a little narrower post-orbital and narrower infraorbital.

Lebiasina bimaculata (Valenciennes).

Head $3\frac{1}{2}$ to $3\frac{1}{2}$; depth $3\frac{1}{4}$ to $3\frac{3}{4}$; D. ii, 8, branched rays once 6; A. iii, 9, 1 or 10, 1; scales 23 or 23 to caudal base and 3 more on latter; 8 scales transversely; 13 or 14 predorsal scales; snout $3\frac{3}{4}$ to $4\frac{2}{5}$ in head from snout tip; eye $4\frac{1}{5}$ to $6\frac{1}{5}$; maxillary 3 to $3\frac{1}{8}$; interorbital $2\frac{2}{3}$ to $3\frac{1}{8}$.

Body robust, compressed, deepest at ventral origin. Head width $1\frac{1}{2}$ to $1\frac{3}{4}$ its length. Snout broadly convex, length $\frac{3}{5}$ to $\frac{3}{4}$ its width. Eye small, center at first third to first $\frac{2}{5}$ in head length. Mouth wide, gape very short and lower jaw well protuded. Maxillary to pupil. Row of small even tripusid teeth in each jaw, 4 extending on each maxillary basally. Nostrils large, together, close before eye. Interorbital broadly convex. Gill-rakers 12 + 16, lanceolate, about $\frac{2}{5}$ of filaments which equal eye. Scales with 4 to 6 basal striae, 5 to 10 apical, 2 or 3 above and below by median, reticulating with age. Dorsal origin midway between caudal base and upper edge of gill-opening, little more advanced in young. Anal entirely behind depressed dorsal. Caudal little forked. Pectoral half way to anal, $\frac{2}{3}$ to anal in young. Ventral inserted very slightly before dorsal origin. Color in alcohol: uniform dull brown. small dusky round spot, not much larger than pupil at caudal base medially. Length 82 to 122 mm. Four from Peru, of which 2 with query to locality.

Cyprinidae.Chondrostominae.Acrocheilus ^Walutacens Agassiz.

75g-34.

Head $4 \frac{2}{5}$; depth $4 \frac{2}{5}$; Diii, 10, 1; A. iii, 9, 1; scales 95 in lateral line to caudal base and 8 more on latter; 27 scales above l. l. to dorsal origin, 19 below to anal origin; 82 predorsal scales; snout $3 \frac{1}{8}$ in head; eye $5 \frac{2}{3}$ to $5 \frac{3}{4}$; maxillary 3 to $3 \frac{1}{3}$; interorbital $2 \frac{3}{5}$ to $2 \frac{2}{3}$; mouth width $3 \frac{1}{4}$ to $3 \frac{3}{4}$.

Body well compressed, deepest at dorsal origin. Caudal peduncle long and slender, least depth about $\frac{1}{3}$ its length or $3 \frac{1}{5}$ in head. Head width $1 \frac{3}{4}$ to 2 in its length. rather obtusely convex, length about $\frac{3}{4}$ its width. Eye small, hind edge about midway in head length. Mouth inferior, transverse, with short gape, each jaw edge as horny plate. Maxillary to nostrils, which together near last third in snout. Interorbital evenly convex. Gill-rakers 5 - 10 short points, $\frac{1}{4}$ of filaments and latter equal eye. Pseudobranchiae about $\frac{3}{5}$ of filaments. Scales small, especially along body edges, notably breast and belly; apical radii 10 to 17; basal radii 10 to 12, though often doubled by incomplete or auxillary marginal radii; circuli moderate. Dorsal origin midway between snout tip and caudal base, first branched ray $1 \frac{1}{4}$ in head. Anal origin close behind dorsal base, first branched ray $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in head. Caudal well forked, with pointed lobes about eye-diameter longer than head and well developed rudimentary caudal rays extending well forward on caudal peduncle edges. Pectoral $1 \frac{1}{10}$ to $1 \frac{1}{8}$ in head or reach

$\frac{3}{4}$ to ventral. Latter inserted well before dorsal and reaches vent close before anal, $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in head. Color in Alcohol; brownish, paler below. Fins brownish. Length 285 mm. Two examples, labeled "Pacific Coast, North America." No. 83,357, U. S. N. M. We think these are the types. Agassiz says (14) "unfortunately the two specimens collected in Columbia River were deprived of their intestines and in one of them only were the pharyngeal bones with their teeth, preserved." These teeth and bones, however, were not with the specimens when we received them, and doubtless were lost long ago. In every other way the specimens appear to agree with the original description.

According to the original drawings "this fish caught with a hook at Dr. Whitman's, in the Walla Walla River. Same as the one taken in the mountains at Willamette Falls." Sketch by Drayton July 10, 1841. A painting, also by Drayton, June 14, 1841 says "caught by natives while fishing in the falls for salmon. This fish is never taken but in rapids or falls, by a net. Natives think a great deal of them. They enter into their superstitions in salmon fishing."

(14) Amer. Jour. Sci. Art. (2) vol. 19, 1855, p. 99, Willamet Falls and in Wallawalla River.

Mylopharodontinae.Mylocheilus caurinus (Richardson). *Fig 35 and 36.*

A drawing of Mylocheilus lateralis Agassiz and Pickering, is 237 mm. long, which is $\frac{2}{3}$ natural size according to the original sketch. The latter says "caught with a hook in the Columbia River at Fort Vancouver. J. Drayton, May 31, 1841." Another drawing shows an example 110 mm. long, and the legend says, J. Drayton, Nesqually, Puget Sound, May 1841, from a fresh-water creek near the fort.

Leuciscinae.Pogonichthys macrolepidotus (Ayres). *Fig-37.*

Two drawings of specimens from the Sacramento River, Calif.

Ptychocheilus oregonensis (Richardson). *Fig. 38.*

Head $3\frac{3}{4}$ to 4; depth $4\frac{4}{5}$ to $5\frac{1}{4}$; D. ii, 7 or 8; A. ii, 7; scales 65 to 70 in lateral line to caudal base and 5 more on latter; 12 to 14 scales above l. l., 6 or 7 below; 34 or 35 predorsal scales; snout $3\frac{1}{6}$ to $3\frac{1}{2}$ in head; eye $3\frac{1}{6}$ to $3\frac{1}{2}$; maxillary 3 to $3\frac{1}{5}$; interorbital $3\frac{1}{5}$ to $3\frac{1}{4}$. Head width half its length. Snout conic, length $\frac{7}{8}$ its width. Maxillary to hind nostril. Lower jaw slightly shorter than upper. Interorbital convex. In alcohol;

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faded pale brownish, pale or whitish below. Sides of head and trunk with silvery-white reflections. Length 74 to 90 mm. Four examples without data, though likely from Willamette Falls?.

The types of P. gracilis Agassiz have not been located in the collection and in his description their dimensions are not given. He says "¹⁵ I have preserved the characteristic of this genus as I had written it four years ago, when I had only the specimens of the Exploring Expedition before me, without any trace of pharyngeals or intestines." The above described examples are young and as they have the viscera intact could not refer to the material he had in mind.

15. Amer. Jour. Sci. Art. (2) vol. 19, 1855, p. 229.

The figure of the type evidently is based on a specimen 232 mm. long, according to the original sketch $\frac{2}{3}$ natural size. The sketch is by Drayton, labeled Willamette Falls, June 13, 1841, and caught with a hook."

Leuciscus balteatus (Richardson).

Sketch of small example "caught with a hook at Fr. Whitman's, July 10, 1841. In Walla Walla, River.

Rasborinae.

Rasborella Fowler and Bean.

Rasborella Fowler and Bean, Proc. U.S.
Nat. Mus., 63, 1923, N.Y. Type Rasborella
dubia Fowler and Bean, orthotypic.

Rasborella dubia Fowler and Bean.

Rasborella dubia Fowler and Bean, l.c.
no locality.

Plotosidae.

Plotosus anguillaris (Bloch).

Five examples 70 to 168 mm. long, from "Pacific"? and Tongataboo. One small example without locality has a scarcely legible label with Fiji? written on it.

In color with blackish edged dorsal, anal and caudal, and lengthwise pale lines. The three small examples all show the supero-lateral and medio-lateral whitish longitudinal lines quite distinct, though lower much broader.

Clariidae.

Clarias batrachus (Linnaeus).

One 240 mm. long from the "Pacific?" It has frontal fontanal entirely behind hind eye edge. D. 66. A. 51. Body depth 6. Space between bony occiput and dorsal origin about 5 in head as measured to end of long occiput.

Tachysuridae.

Hexanematichthys caelatus (Valenciennes).

Head $3\frac{3}{4}$; depth 5; D. I, 7; A. v, 17; snout $2\frac{3}{4}$ in head; eye 5; maxillary 3; interorbital $2\frac{1}{4}$.

Body well compressed, caudal peduncle with least depth $2\frac{1}{4}$ in its length or $3\frac{3}{4}$ in head. Head width $1\frac{1}{5}$ its length. Snout convex, length $\frac{2}{3}$ its width. Eye moderate, hind edge about midway in head as seen in profile. Mouth wide, short gape extends slightly beyond hind nostril. Upper jaw protrudes. Jaws with broad bands of fine pointed teeth; large ovate patch of vomeropalatine teeth, coarser, rather obtuse, stout, width of each patch greater than bands in jaws, though well separated at vomer. Maxillary barbel slightly beyond depressed pectoral tip; outer mental barbel to middle of pectoral spine; inner mental barbel $\frac{3}{4}$ to pectoral origin. Nostrils large, together, frenum about first $\frac{2}{5}$ in snout profile. Interorbital elevated convexly, broadly depressed medially. Cranium strongly rugose-striate. Broad fontanel behind eye to apex which forms at supraoccipital. Gill-rakers 6 - 10, lanceolate, about $\frac{3}{5}$ of filaments, latter $1\frac{1}{5}$ in eye. Fin spines (tip broken) edged with bony granules basally and antrorse serrae terminally. Dorsal origin about midway between snout tip and adipose fin origin. Latter little nearer last dorsal ray base than that of caudal, length equals interorbital. Anal origin about midway between spinous dorsal origin and caudal base. Caudal deeply forked, length (tip damaged) about $1\frac{1}{6}$ in head. Pectoral about $\frac{3}{5}$ to ventral, latter inserted well behind dorsal base or about

midway between hind nostril and caudal base, fin $5/6$ to anal.

Color in alcohol: faded-grayish-brown above. Roughened cranium and snout brownish. Sides of head and under surface silvery-white. Iris pale brown, also barbels. Fins brownish, paler basally. Adipose fin with terminal portion largely blackish. Length 106 mm. Singapore.

Galeichthys simonsi Starks.

Head $3 \frac{4}{5}$; depth 6; D. I, 7; A. v, 10; snout 3 in head; eye 6; maxillary 3; interorbital $2 \frac{2}{5}$.

Body elongate, slender, moderately compressed. Caudal peduncle well compressed, least depth $3 \frac{1}{3}$ its length or $4 \frac{1}{3}$ in head. Head width $1 \frac{1}{5}$ its length. Snout wide, depressed, length half its width. Eye center near first third in head; eye $1 \frac{3}{4}$ in snout in profile. Maxillary about to eye. Jaws with broad bands of fine pointed teeth and much narrower parallel bands as vomero-palatine, but not joined across vomer. Maxillary barbel to pectoral origin, outer mental slightly behind eye and inner mental to gill-opening or hind eye edge. Nostrils large, together, frenum at first third in snout. Interorbital elevated convexly, broadly depressed medially. Cranium rugose and long narrow fontanal from opposite hind part of eye to occiput. Gill-rakers 5 - 9, lanceolate, about $2/5$ of filaments which equal eye. Fin spines damaged. Dorsal origin nearly an eye-diameter nearer snout

tip than adipose fin origin, depressed fin $1\frac{3}{4}$ to latter. Adipose large, twice size of eye. Anal origin little nearer caudal base than first dorsal origin, front rays much larger than others, depressed fin $1\frac{4}{5}$ to caudal base. Pectoral (to longest or first ray tip) reaches $1\frac{3}{4}$ to ventral. Latter inserted well behind first dorsal base or about midway between front eye edge and caudal base, extends beyond anal origin or about opposite adipose fin origin. Color in alcohol: brown on back. Silvery-whitish streak from shoulder to caudal base medially. Under surface of head and body pale or whitish. Barbels dull brown. Iris brownish with pale yellow tinge. Fins brown, darker terminally and ventral edge narrowly whitish. Caudal uniform dull brown. Length 270 mm. Though without locality this specimen may have been obtained in Peru?.

Tachysurus equatorialis Starks.

Head $3\frac{4}{5}$ to $3\frac{7}{8}$; depth $5\frac{1}{4}$ to $5\frac{1}{2}$; D. I, 7; A. v, 15 or 16; Snout $2\frac{7}{8}$ in head; eye $4\frac{1}{5}$ to 5; maxillary $3\frac{7}{8}$ to 4; interorbital $2\frac{3}{5}$ to $2\frac{3}{4}$.

Body moderately elongate, compressed. least depth about half its length or $3\frac{3}{5}$ to $3\frac{4}{5}$ in head. Head width $1\frac{1}{3}$ to $1\frac{2}{5}$ in its length. Snout moderately wide, convex, length $\frac{3}{5}$ to $\frac{2}{3}$ its width. Eye center about first $\frac{2}{5}$ in head, $1\frac{1}{2}$ to 2 in snout in profile. Maxillary half way to eye. Jaws with broad bands of fine teeth. Narrow median cutaneous fold on vomer. Each palatin with much wider band of rather blunt teeth, widely separated or lateral in mouth. Maxillary

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barbel reaches pectoral origin, outer mental eye-diameter behind eye and inner mental not nearly to gill-opening or opposite to hind pupil edge. Nostrils large, together, hind one midway in snout length. Interorbital elevated convexly, broadly depressed medially. Cranium rugose. Fontanel begins close behind eye narrow and extends to occipital buckler. Gill-rakers 6 - 10, lanceolate, about $2/5$ of filaments, which $1 \frac{2}{3}$ in eye. Front portion of lateral line and upper humeral region with many pores and dermal striae. Fin-spines antrorsely serrate on both edges; dorsal spine $1\frac{1}{2}$ to $1 \frac{1}{2}$ in head; pectoral $1 \frac{1}{3}$ to $1 \frac{3}{5}$.

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Dorsal origin about midway between snout tip and adipose fin origin, fin reaching $1\frac{1}{2}$ to 2 to adipose fin. Latter about long as snout.. Anal origin midway between first dorsal origin and caudal base, slightly more posterior in small examples. Pectoral reaches $1\frac{1}{4}$ to $1\frac{2}{3}$ to ventral and latter inserted about midway between front eye edge and caudal base, nearly reaches anal. Color in alcohol: brownish above. Sides and under surface whitish, former silvered. Iris brownish, also barbels. Fins brown. Two examples 155 to 188 mm. These without data though likely from Peru?

Tachysurus leiotetocephalus (Bleeker).

Head $3\frac{1}{5}$; depth $4\frac{1}{2}$; D. I, 7; A. v, 11; Snout $2\frac{1}{2}$ in head; eye $6\frac{1}{3}$; Maxillary $4\frac{2}{5}$; interorbital 2.

Body moderately elongate, well compressed. Caudal peduncle well compressed, least depth $3\frac{2}{5}$ in head, $1\frac{1}{4}$ in its own length. Head width $1\frac{1}{2}$ its length. Snout broad, rather depressed, length $\frac{3}{4}$ its width. Eye rather low, $2\frac{3}{4}$ in snout, hind pupil edge about midway in head length. Mouth broad with short gape about to hind nostril, latter near first third in snout. Upper jaw protruding. Teeth lanceolate, slenderly pointed, in bands in jaws; small patch of rather obtuse teeth each side of vomer, well separated; palatin patch 4 or 5 times as long, of larger and more blunt teeth, each patch well separated. Maxillary barbel to pectoral origin, outer

mental to gill-opening or about eye-diameter beyond eye
and inner mental not quite to gill opening or about op-
posite hind eye edge. Interorbital broadly convex. Antero-
supraorbital well elevated, with swollen appearance and
occipital buckler likewise. Top of head smooth, except
several low ridges converging back at end of median fon-
tanel, apex of which midway between front eye edge and
first dorsal origin. Gill-rakers 5 - 7, lanceolate, half
of filaments. Humeral process smooth, extends about $2/5$ in
pectoral spine. Fin spines with antrorse serrae along each
edge; dorsal spine $1 \frac{3}{5}$ in head; pectoral $1 \frac{3}{5}$. First
dorsal origin midway between snout tip and hind basal edge
of adipose fin, fin length $1 \frac{2}{3}$ to adipose fin origin.
Latter inserted about midway between depressed spinous
dorsal tip and caudal base, fin $1 \frac{1}{2}$ in snout. Anal inserted
little nearer caudal base than depressed pectoral tip, fin
 $3/5$ to caudal base. Caudal deeply forked (damaged), nearly
long as head and rudimentary rays extended well forward

Eye center about first $2/5$ in head, $1\frac{1}{2}$ to 2 in snout in profile. Maxillary half way to eye. Jaws with broad bands of fine teeth. Narrow median cutaneous fold on vomer. Each palatine with much wider band of rather blunt teeth, widely separated or lateral in mouth. Maxillary barbel reaches pectoral origin, outer mental eye-diameter behind eye and inner mental not nearly to gill-opening or opposite hind pupil edge. Nostrils large, together, hind one midway in snout length. Interorbital elevated convexly, broadly depressed medially. Cranium rugose. Fontanel begins close behind eye, narrow and extends to occipital buckler. Gill-rakers 6 - 10, lanceolate, about $2/5$ of filaments, which are $1\frac{2}{3}$ in eye. Front portion of lateral line and upper humeral region with many pores and dermal striae. Fin-spines antrorsely serrate on both edges; dorsal spine $1\frac{1}{4}$ to $1\frac{1}{2}$ in head; pectoral $1\frac{1}{3}$ to $1\frac{3}{5}$. Ventral and latter inserted midway between hind pupil edge and caudal base, fin (damaged) $7/8$ to anal.

Color in alcohol: warm brownish above. Sides and below whitish with silvery tinge. Fins all brownish, Also barbels and iris. Length 250 mm. (caudal tips damaged). Manila.

Tachysurus maculatus (Thunberg).

Head $3 \frac{2}{5}$; depth $5 \frac{1}{4}$; D. I, 7; A. v, 14; snout $2 \frac{5}{6}$ in head; eye $5 \frac{4}{5}$; maxillary 4; interorbital $2 \frac{1}{3}$.

Body elongate, well compressed. Caudal peduncle well compressed, least depth half its length or 4 in head. Head width $1 \frac{2}{5}$ its length. Snout wide, well depressed, length about $\frac{2}{3}$ its width. Eye moderately supero-lateral, $2 \frac{1}{8}$ in snout, hind edge about midway in head length. Mouth wide, short gape to hind nostril, latter about first third in snout. Upper jaw well protruded. Teeth in jaws finely lanceolate, in bands, upper band much wider, especially behind, while lower much narrower behind. Small elongate patch of rather obtuse teeth on each palatin, well separated. Maxillary barbel to end of humeral process or about first $\frac{2}{5}$ of depressed pectoral spine; outer mental slightly beyond middle of humeral process; inner mental about $\frac{7}{8}$ to gill-opening. Interorbital slightly elevated, flattened medially, antero-supraorbital very small knob. Cranial bones rugose striate. Narrow fontanel begins close behind eye and not quite reaching supraoccipital. Gill-rakers 8 - 14, lanceolate, nearly long as filaments or about $1 \frac{1}{2}$ in eye. Fin spines with bony tubercles basally and antrorse serrae terminally; dorsal spine $1 \frac{3}{4}$ in head; pectoral $1 \frac{3}{5}$. First dorsal origin midway between snout tip and adipose fin origin, depressed fin $1 \frac{1}{2}$ to latter. Adipose fin long as snout, inserted about an eye-diameter nearer depressed dorsal spine tip than caudal base. Anal inserted about midway between pectoral tip and caudal base, first branched rays longest and depress back

beyond others, fin $1\frac{1}{2}$ to caudal base. Caudal deeply forked, about long as head and rudimentary rays extended well forward. Pectoral $1\frac{2}{5}$ to ventral, latter inserted midway between front eye edge and caudal base, fin to anal.

Color in alcohol: gray-brown above, head more brownish. Sides and lower surfaces of head and body silvery-whitish. Iris and barbels dull brownish. Fins all brownish. Adipose fin deep brown basally. Length 200 mm. Labeled as "Pacific" though possibly may have come from Manila?.

Pygidiidae.

Pygidium dispar Tschudi.

Head $4\frac{1}{2}$ to $5\frac{1}{3}$; depth $6\frac{1}{6}$ to 7; D. v, 6, 1; A. iv, 5; snout 2 to $2\frac{1}{8}$ in head; mouth wide $2\frac{1}{2}$ to 3; interorbital $2\frac{4}{5}$ to 3; dorsal length $1\frac{1}{8}$ to $1\frac{1}{5}$; anal $1\frac{1}{8}$ to $1\frac{2}{5}$; caudal 1 to $1\frac{1}{4}$; pectoral $1\frac{1}{8}$ to $1\frac{1}{3}$; ventral $1\frac{3}{4}$ to 2.

Body strongly compressed, deepest at dorsal origin. Cau-

dal peduncle large, well compressed, least depth $1\frac{1}{2}$ to $1\frac{3}{5}$ its length or $1\frac{2}{5}$ to $1\frac{7}{8}$ in head. Head width $1\frac{1}{8}$ to $1\frac{1}{5}$ its length. Snout long, depressed. Eye very small, front edge about midway in head length, little advanced in young, diameter 4 in interorbital. Mouth wide, gape very short. Upper jaw protrudes. Lips thick, fleshy, finely papillose. Each jaw with broad bands of fine lanceolate teeth. Upper inner buccal fold much broader than lower. Upper maxillary barbel $\frac{5}{4}$ to pectoral origin, lower $\frac{2}{3}$; nasal barbel extends back about an eye-diameter beyond eye. Hind nostril about an eye-diameter behind front one, or about midway in snout length. Along preopercle edge 4 rows of spines, hind ones twice length of others. Opercular spines similar, fewer, and of much less extent. Gill-rakers 2 - 5, short fleshy rounded tubercles, much shorter than filaments. Dorsal origin little nearer depressed pectoral tip than caudal base, to midway in young. Anal inserted close behind dorsal base. Caudal slightly concave behind, expands truncate. Pectoral small, low, outermost ray ending in short filament. Ventral inserted before dorsal origin, reaches vent or $\frac{3}{4}$ to anal, shorter in young.

Color in alcohol: russet-brown generally, marked everywhere with round dark or dusky spots, large as or little larger than eye, though pattern with rather even specked appearance. Spots especially smaller on upper surface of head. Fins with similar spots to those on body, only more obscure. Four examples, 133 to 240 mm. from Peru, of which

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one in the Academy collection obtained by Orton. The
Wilkes examples are faded dull and nearly uniform brown.

Synodontidae.

Synodus japonicus (Houttuyn). #24.32.

The material in the collection seems to correspond in large measure to the characters of the present species. It apparently would represent mostly the dark or greenish phase ascribed to the species. Besides these we have included the examples in the Academy recently described as S. dermatogenys Fowler, (12) with the conclusion the same must be submerged as a synonym. It is based on 5 specimens, the type and 2 paratypes evidently representing the red phase, while the 2 remaining paratypes are likely the green phase. None of these examples show the large scales on the lower cheek, as indicated by Jordan and Evermann. (13) The cheek below shows little or no indication of scales in most cases, and when so, the scales are always smaller than those median or above. The specimens representing the red phase show slightly shorter ventrals and a somewhat larger eye. In scale structure no difference can be

detected, except that due to age, as all small or medium sized individuals have but 3 basal radii and the fourth only appears in larger examples. All the scales have fine circuli basally, none apically and becoming coarser above

(12) Proc. Acad. Nat. Sci. Phila., 1911 (1912), p. 566, fig. 3, Hawaiian Islands.

(13) Bull. U. S. Fish Comm., vol. 23, 1903 (1905), p. 64, fig. 14.

and below.

We have 3 from Fiji, and one from the Hawaiian Islands, which show: Head $3 \frac{1}{3}$ to $3 \frac{3}{5}$; depth 6 to $7 \frac{3}{4}$; D. ii, 10, 1; A. 9; lateral line with 59 or 60 scales to caudal base and 4 more on latter; 5 or 6 scales above l. l. to dorsal origin, 6 or 7 below to anal origin; 19 to 22 predorsal scales; snout 4 or 5 in head measured from upper jaw tip; eye $5 \frac{1}{2}$ to $7 \frac{3}{4}$; maxillary $1 \frac{1}{2}$ to $1 \frac{3}{5}$; interorbital $5 \frac{7}{8}$ to 7; ventral reaches l 2.3 to $1 \frac{7}{8}$ to anal; length 77 to 180 mm.

Saurida gracilis (Quoy and Gaimard). *Fig. 33.*

Head $3 \frac{2}{3}$ to $4 \frac{1}{2}$; depth $6 \frac{1}{4}$ to $8 \frac{1}{2}$; D. ii, 9, 1, branched rays rarely 8; A. ii, 8, 1, branched rays vary 7 to 9 and rarely 10; scales 47 to 51 in lateral line to caudal base and 3 or 4 more on latter; 3 scales above l. l., seldom 4, and 5 below, vary 4 to 6; predorsal scales 16 to 19; snout 4 to $4 \frac{4}{5}$ in head from upper jaw tip; eye 4 to $6 \frac{1}{5}$;

premaxillary $1 \frac{1}{3}$ to $1 \frac{3}{5}$; interorbital 4 to 6. Body elongately fusiform, nearly cylindrical; least depth of caudal peduncle equals its width or about half its length. Snout length about $\frac{7}{8}$ its width. Lips not developed. Interorbital concave. Gill-rakers minute, fine denticles. Scales with 2 to 4 basal striae. Circuli fine, obsolete apically and usually few coarse apical reticulations, little developed in young. In alcohol; uniform brownish. Upper surface obscurely mottled or specked with slightly darker tint. About 6 dull darker saddles on back and side. Deep brown cross-bar over mandible below eye and 2 less distinct narrower ones posteriorly. Fins dull brown, with rows of obscure darker spots forming cross-bars. Length 67 to 110 mm.

Six examples, of which one from Manila, 3 from Oahu and one from Samoa. We also include 6 Hawaiian examples and the types of Synodus sharpi Fowler, in the Academy.

Compared with 3 examples of Saurida argyrophanes Richardson, from the Philippines, now in the Academy, the scales of the latter are similar, except they do not show the apical reticulations. Both species have the upper teeth in 4 lateral rows though the dentition of S. argyrophanes distinctly weaker.

Myctophidae.

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Rhinorhynchus cocco (Cocco). Fig. 33a.

Drawing of an example without data, by J. H. Richard. A color sketch by J. F. Grayton is from an example taken in the Southern Pacific Ocean in S. Lat. 37° W. Long. 76° . Scales on each side of the median line bright silvery. Eye bright silvery with reddish in upper part, pupil light purple with a blue flush. Body shown generally deep blue or violet, fins all pale or heliotrope purple.

Poeciliidae.

Fitzroyia lineata (Jenyns).

Head 3; depth $3 \frac{1}{8}$; D. ii, 6; A. ii. 7; Scales 26 in median lateral series from shoulder to caudal base and 4 more on latter; 9 scales transversely at dorsal and ventral origins; 14 predorsal scales to head; snout 3 in head from upper jaw tip; eye 3; maxillary 3; interorbital $2 \frac{1}{8}$. Contour ovoid, well compressed; strongly compressed caudal peduncle with least depth $1 \frac{3}{5}$ its length or about half total head length. Head width $1 \frac{2}{3}$ its length. Snout depressed, about half long as wide. Eye high, next to upper profile, hind pupil edge about midway in head length. Jaws greatly protractile, lower protruding. Teeth in jaws tricuspid; outer series enlarged and form close-set row all round, behind which about 7 irregular rows form broad band. Maxillary vertical, hind edge about $\frac{3}{4}$ in snout. Interorbital flat. Gill-rakers 1 - 8 short robust points, about $\frac{1}{4}$ of filaments, which are $\frac{2}{3}$ of eye. Scales adherent, with 10 to 20 basal horizontal parallel marginal striae and circuli rather fine, apical circuli coarse. Mandible with 3 pores each side of symphysis. Dorsal origin little nearer gill-opening than caudal base, depressed fin about half way to latter. Anal inserted about opposite first third of dorsal base, fin extends back further, smaller or depressed $\frac{2}{5}$ to caudal base. Caudal rounded, about $1 \frac{1}{3}$? in head; pectoral $1 \frac{4}{5}$; ventral $2 \frac{5}{4}$. Anal opening fleshy and genital pore with slight or low sheath entirely before anal fin.

Color in alcohol: dull brownish, little paler below. Each row of scales on sides with median dark brown narrow line, sometimes broken or with spotted appearance and lower lines paler. Fins brownish, ventral and anal quite pale. Iris brown. Length 57 mm. Rio Janeiro.

Jenyns originally described this species³² from a slightly smaller example obtained at Maldonado. He gives the teeth as "a single closely-set series."

32 Voy. Beagle, Fish, 4, 1842, p. 116, Pl. 22, fig. 2,.

Phalloptychus januarius (Hensel).

Head 3 to $3\frac{3}{4}$; depth $3\frac{1}{4}$ to $3\frac{1}{3}$; D. ii. 5 or 6; A. 5; scales 30 or 31 in median lateral series to caudal base and 3 or 4 more on latter; 9 scales transversely at dorsal and ventral origins; about 17 predorsal scales to head; snout 4 to $4\frac{1}{2}$ in head from upper jaw tip; eye $2\frac{1}{2}$ to 3; maxillary $3\frac{1}{8}$ to 4; interorbital $1\frac{4}{5}$ to $2\frac{1}{6}$. Contour elongately ovoid, well compressed. Head width $1\frac{1}{2}$ to 2 in its length. Snout depressed, length about $\frac{1}{2}$ to $\frac{2}{3}$ its width. Eye with hind pupil edge slightly advanced in head length. Mouth small, jaws greatly protractile and lower greatly protrudes. Teeth uniserial, small, simple, close-set. Interorbital level. Scales with 11 or 12 in male, 17 in female, basal marginal parallel striae; circuli coarse. Dorsal origin about midway between preopercle edge and caudal base in male; about midway between pectoral origin and caudal base in fe-

male. Anal origin of male nearer snout tip than depressed anal organ; in female about midway between preopercle edge and caudal base; male organ nearly half of body to caudal base.

Color in alcohol: brownish. Male 18mm., two females 28 mm. Rio Janeiro.

The intromittent organ agrees with Regan's figure³³ except the terminal serrae of second ray not twisted forward.

33 Proc. Zool. Soc. London, 1913, p. 999, fig. 171a.

Phalloceros candimaculatus (Hensel).

Head $3 \frac{1}{6}$ to 4; depth 3 to $3 \frac{3}{4}$; D. i to iii, 6 or 7; A. ii to iv, 6 or 7; scales 28 to 30 in median lateral series to caudal base and 3 or 4 more on latter; 8 to 10 scales transversely at dorsal and ventral origins; 16 or 17 predorsal scales; snout $3 \frac{1}{3}$ to 4 in head from upper jaw tip; eye $2 \frac{1}{3}$ to 3; maxillary $4 \frac{1}{5}$; interorbital 2 to $2 \frac{1}{2}$. Contour elongately ovoid, well compressed. Head width $1 \frac{2}{5}$ to $1 \frac{3}{4}$ its total length. Eye with hind pupil edge about midway in head length. Mouth small. Jaws greatly protractile, lower well protruded. Teeth uniserial, small, simple, close-set, rather blunt. Interorbital level. Scales of male with 12 or 13 basal parallel marginal striae, 13 to 16 in female; circuli of both rather coarse. Dorsal in male inserted midway between hind eye edge and gill-opening and caudal base; in female midway between gill-opening and caudal base. Young

male with anal origin nearer snout tip than end of depressed organ; about midway in larger examples; organ 2 to $2\frac{1}{4}$ in body to caudal base.

Color in alcohol: brownish, lower surface uniformly pale. Edges of each scale dark, forming reticulating pattern. Vertical dusky blotch below last dorsal rays. About 12 narrow dark brown streaks vertically in male, more wide-spread on caudal peduncle, and dark spot at caudal base.

Length 20 to 38 mm. We also include besides one in the Wilkes Collection from Rio Janeiro, 2 females in the Academy from Rio Grande do Sul and a male and female from Puerto Bertoni, Paraguay.

Poecilia vivipara Schneider.

Head 3 to $3\frac{2}{3}$; depth 3; D. i, 6; A. i, 6; scales 24 to 27 in median lateral series to caudal base and 5 to 7 more on latter; 9 scales transversely at dorsal and ventral origins; 13 predorsal scales to head; snout $3\frac{1}{4}$ to $3\frac{2}{5}$ in head; eye $3\frac{1}{5}$ to $3\frac{1}{4}$; mouth width $2\frac{2}{5}$ to $2\frac{2}{3}$; interorbital $1\frac{7}{8}$ to 2. Body compressed, female deeper bodied. Head width $1\frac{1}{4}$ to $1\frac{2}{5}$ its length. Snout broad, depressed, length 2 in width. Hind eye edge about midway in head. Teeth fine, slender, ends spatulate, in outer row; finer parallel minute teeth in inner row. Interorbital flat. Gill-rakers about 22 short flexible points on ceratobranchial, about $\frac{1}{8}$ of gill-filaments. Scales with 13 to 16 basal

parallel short marginal striae in male, to 19 in female.

Dorsal origin about midway between hind eye edge and caudal base in male; midway between pectoral origin and caudal base in female. Pectoral $1 \frac{1}{8}$ to $1 \frac{1}{2}$ in head. Ventral with second ray elongated. Male with first and second anal rays prolonged, without appendages, ends with cutaneous hood, spineless, and first ray with several segments terminally forming acute serrations.

Color in alcohol: dull brownish, paler below, Scales edges on back mostly darker than ground color. Male with at least 7 narrow dark vertical cross-bars or lines, and above black blotch little smaller than eye near pectoral end, sometimes ocellate or with pale edge. Blackish transverse bar on dorsal sub-basally and sometimes several darker blotches above. Adult male with caudal edges above and below narrowly blackish, especially about rudimentary rays. Female also shows blackish blotches on back behind pectoral end or close before dorsal, and another from ventral axilla toward anal origin, latter not seen in male. Both sexes usually show 2 or 3 dark cross-bars on caudal. Female with less conspicuous markings or only faint cross-bars on dorsal and caudal. Males 33 to 48 mm., females 47 to 60 mm. Six examples from Rio Janeiro.

We have also compared examples in the Academy from Surinam and Porto Rico. From the last locality males often show 12 to 14 lateral dark cross-lines and caudal base with upper and lower caudal peduncle edges with more or less blackish broadly

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Belonidae.

Strongylura strongylura (Van Hasselt). *Fig. 72.*

Head (from end of frontal process to end of hind opercle edge⁴²) $4\frac{1}{2}$ to $4\frac{3}{4}$; depth $1\frac{1}{2}$ to $1\frac{1}{2}$ in postocular region; D. ii, 11 or 12; A. ii, 13 to 15; scales 132 to 155 from shoulder to caudal base medially, and 10 to 15 more on latter; predorsal scales 90 to 120 to occiput; end of frontal process to eye $2\frac{1}{4}$ to $2\frac{4}{5}$ in rest of head posteriorly; snout width $1\frac{1}{6}$ to $1\frac{2}{3}$ in former; eye $2\frac{3}{5}$ to 3 in postocular; interorbital $2\frac{2}{5}$ to $2\frac{7}{8}$; combined eye and postocular 2 to $2\frac{1}{4}$ in beak. Body subcylindrical. Caudal peduncle little compressed, width about $\frac{2}{3}$ its least depth and latter about equals eye, without keel. Head moderately constricted below, width $1\frac{7}{8}$ to $2\frac{1}{4}$ in postocular. Jaws slender (damaged). Eye close to upper profile, ellipsoid. Maxillary to pupil, mostly concealed. Moderate band of fine outer teeth and inner row of moderate well-spaced larger ones. Triangular nasal cavity about half of eye. Interorbital broad, level, with wide distinct median groove, bony surface finely striate, less distinct in young. Gill-opening forward to hind pupil edge, or little posterior. Gill-filaments about $\frac{3}{5}$ of eye. Scales largely adherent, little larger on hind portions of body;

⁴² We use these limits in the measurements of the head in all the species in this family unless otherwise stated.

circuli complete, 36 to 48; cheeks with 12 rows of scales to preopercle ridge; Dorsal, anal and caudal base scaly. Lateral line with short branch toward pectoral base. Dorsal inserted behind anal origin, no little behind last third be-

tween gill-opening and caudal base, first branched ray 1 to $1 \frac{2}{5}$ in postocular. Anal inserted before dorsal origin, though much nearer ventral than caudal base, first branched ray about equals postocular region. Caudal with lower rays little longer, hind edge oblique downwards and fin $1 \frac{2}{5}$ to $1 \frac{2}{3}$ in head from frontal process; pectoral $1 \frac{2}{3}$ to $1 \frac{4}{5}$; ventral $2 \frac{1}{2}$ to $2 \frac{3}{5}$, inserted about midway between eye center and caudal base.

Color in alcohol: faded brownish generally, sides and below with silvery reflections. Silvery streaks from shoulder to caudal base, expands between dorsal and anal about equal to pectoral in diwth. Round blackish spot about size of pupil at base of upper median caudal rays. Length 230 to 280 mm. (caudal damaged). Besides an example from Singapore in the Wilkes Collection we also include 4 in the Academy from the Philippines.

We adopt the generic name Strongylura Van Hasselt as it was proposed more than a decade before Tylosurus. Ogilby recently proposed ⁴³two new genera as Stenocaulis, type Belone krefftii Gunther, and Eurycaulus, type Belone platyura Bennett, in both cases the species designated monotypes. Eurycaulus Ogilby, however, give way to the same name proposed by Fairm in 1868 for Coleoptera. This will then allow Platybelone Fowler,⁴⁴ type Belone platyura Bennett, as the next available name, which may be retained as a valid subgenus under Belone Cuvier. Stenocaulis and Tylosurus may both be retained as subgenera under Strongylura.

43 Proc. Roy. Soc. Queensland, vol. 21, 1908, p. 90.

44 Proc. Acad. Nat. Sci. Phila., 1919, p. 2.

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Strongylura timucu (Walbaum). *Fig. 73.*

Head (from upper jaw tip) $2 \frac{4}{5}$ to 3; depth $1 \frac{1}{2}$ to $1 \frac{1}{2}$ in postocular region; D. 11, 13 or 14; A. 11, 14 to 16; scales 218 to 260 from shoulder to caudal base medially; predorsal scales 150 to 200; end of frontal process to eye 4 in rest of upper jaw, about equals width at eye; eye $2 \frac{3}{4}$ to $3 \frac{3}{5}$ in postocular; interorbital $2 \frac{1}{5}$ to $2 \frac{1}{3}$. Body subcylindrical. Caudal peduncle compressed or width about half its least depth and latter $1 \frac{1}{4}$ to $1 \frac{1}{2}$ in eye. Head constricted below, width $1 \frac{2}{3}$ to $1 \frac{4}{5}$ in postocular. Jaws not completely closing basally and lower with fleshy tip longer than upper by nearly pupil length. Eye close to upper profile, not impinging. Maxillary well exposed below, slightly beyond eye front though not to pupil. Either band of teeth narrow very fine, inner well spaced. Triangular nasal cavity about long as pupil. Interorbital and top of head level, with broad even depression medially, only about half way to occiput. Bones on head above with rather obsolete coarse atriæ. Gill-opening forward to eye center and filaments about $\frac{2}{5}$ or little less than half of eye. Scales moderate, with about 33 to 45 circuli, becoming incomplete down median axis with age; middle of back with 3 rows of enlarged scales; cheek with 16 or 17 rows of scales to preopercle. Lateral line with short branch to pectoral base, ascends after dorsal midway along side of caudal peduncle. Dorsal inserted slightly behind anal origin or about last fourth between eye and caudal base, with lobe in front and anal similar, only little larger. Caudal little

emarginate behind, lower lobe little longer, equals post-orbital and half of eye. Pectoral inserted little high, about $\frac{1}{4}$ to $\frac{1}{3}$ of eye longer than postocular. Ventral inserted about midway between preopercle ridge and caudal base, slightly advanced with age, $1 \frac{2}{3}$ to $1 \frac{3}{4}$ in postocular.

Color in alcohol: dull brownish generally, paler to silvery-white below. narrow whitish streak along side, begins well behind pectoral and widest equals pupil-diameter, opposite front of dorsal and anal, and continued to caudal. Fins all brownish, ventral, anal and pectoral little paler. Dorsal and anal lobes, caudal and pectoral, with some dusky terminally. Length 393 to 490 mm. One from Rio Janeiro, and other examples in the Academy from Santo Domingo and Colon.

We find no characters upon a further detailed comparison of the above material with Belone diplotaenia, Cope, for its retention as a distinct species. We therefore follow Fowler as set forth in his redescription of the type.⁴⁵ The species is now distributed from Florida to Rio Janeiro.

Fig. 74

Strongylura tahitiensis Fowler and Bean;

Strongylura tahitiensis Fowler and Bean,

Proc. U. S. Nat. Mus., 63, 1923, p. 10.

Tahiti.

Drawing of an example, evidently the type, though without locality.

Fig. 75

Strongylura stolzmanni (Steindachner).

Head $5\frac{1}{4}$; depth $1\frac{1}{8}$ in postocular region; D. 11, 13;

A. 11, 14; scales about 250 from shoulder to caudal base medially; 195 predorsal scales to head; end of frontal process to eye $2\frac{4}{5}$ in rest of head posteriorly; snout width equals frontal process to eye; eye 3 in postocular; interorbital $2\frac{2}{5}$; combined eye and postocular $1\frac{1}{2}$ at least in beak (broken).

Body subcylindrical. Caudal peduncle depressed, about wide

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as deep and least depth $3 \frac{2}{5}$ in postocular. Jaws rather slender, depressed (damaged). Eye close to upper profile, ellipsoid. Maxillary not quite to pupil, only half concealed. Band of outer teeth fine and inner row of moderately larger well-spaced ones. Triangular nasal cavity about $\frac{3}{4}$ of pupil. Interorbital slightly concave, with broad median shallow depression, bony surface smooth. Gill-opening forward to front pupil edge. Gill-filaments about $\frac{1}{4}$ of eye. Scales

45 Proc. Acad. Nat. Sci. Phila., 1919, p. 136.

largely adherent, mostly uniform in size; Dorsal, anal and caudal scaly basally; circuli 12 to 44, fewer on dorsal and smaller scales, where usually complete, others largely incomplete above and below; cheeks with 30 rows of scales to preopercle ridge. Lateral line with short branch toward pectoral base. Dorsal inserted behind anal origin, or about last fourth between preopercle ridge and caudal base. Anal origin little nearer ventral than caudal base. Pectoral slightly less than postocular. Ventral half of postocular, inserted about eye-diameter nearer caudal base than hind eye edge.

Color in alcohol: dull brownish generally, sides and below with traces of silvery-white. Length 620 mm. (tail and beak damaged). Peru.

Strongylura choram (Rüppell). ~~Forsk.~~ Fig. 76.

Drawing of an example from Tahiti, by Richardson, which largely agrees with Bleeker's figure.

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Strongylura crocodila (Le Sueur).

Head (from upper jaw tip) $3 \frac{1}{6}$ to $3 \frac{1}{4}$?; depth 1 to $1 \frac{1}{2}$ in postocular; D. 11, 20 or 21; A. 11, 19; scales 315 to 336 from shoulder to caudal base medially; 227 to 245 predorsal scales to head; end of frontal process to eye $3?$ to $3?$ to $3 \frac{1}{2}$ in rest of snout; width about $\frac{1}{6}$ to $\frac{1}{5}$ greater than length of former; eye $2 \frac{1}{3}$ in postocular; interorbital

$1 \frac{3}{5}$ to $1 \frac{3}{4}$. Body subcylindrical, with slight ridge along each side of back below dorsal. Caudal peduncle compressed, width $\frac{2}{3}$ to $\frac{3}{4}$ its least depth and latter $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in eye. Head constricted moderately below, width $1 \frac{1}{4}$ to $1 \frac{1}{3}$ in postocular. Jaws not completely closing basally. Eye close to upper profile and combined with postocular nearly half of beak. Maxillary concealed, slightly beyond front eye edge, though not quite to pupil. Rather wide band of outer minute teeth and row of inner large close-set, especially lower. Triangular nasal cavity long as pupil. Broad interorbital with moderately concave median depression extending to occiput. Bones of head above with finely striate surfaces. Gill-opening to front edge of nasal cavity, and filaments about half of eye. Scales very small, crowded, largest about dorsal and anal, with about 32 to 36 parallel circuli each side as usually incomplete down median vertical axis. Cheeks with 25 or 26 scales and 5 more over front of opercle, greater hind portion of latter entirely naked. Lateral line with short branch up to pectoral base and slight keel along side of caudal peduncle to caudal base. Dorsal origin slightly behind anal origin, near or slightly before last third between gill-opening and caudal base, front rays forming short lobe. Anal similar, slightly larger. Caudal well forked, lower lobe slightly longer. Pectoral long as postocular and $\frac{1}{3}$ of eye, uppermost ray enlarged. Ventral inserted about midway between hind pupil edge, or front eye edge and caudal base, 1 to $1 \frac{1}{2}$ in postocular and its front ray also enlarged.

Color in alcohol: faded dull brownish. Length 330 to 610 mm. (beak and caudal tips damaged). One listed from Fiji or Samoa, though label appears to give "south-east of Tahiti".

We also include a small example from Sumatra in the Academy, with the above. When received fresh in arrack it was deep hyaline-green above, line of demarcation on back above distinct. Sides and lower surface of head and body silvery -white. Pectoral base greenish, fin blackish terminally. Ventral and anal white basally, terminally grayish or dusky. Dusky dorsal with front rays dull olivaceous basally.

Though our Polynesian example has its trunk slightly more compressed, we cannot help attribute it to preservation or packing, as the surface is asymmetrical in places. Eventually it may not be found inseparable from S. choram (Forsk.) It shows the same sculpturing on the upper surface of the head when compared with a West African example, though the slight differences relative to the gill-opening and maxillary still hold.

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Strongylura gigantea (Schlegel). *Fig. 77.*

Head $3 \frac{1}{5}$ to $3 \frac{1}{3}$; (end of beak slightly damaged) depth $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in postocular; D. ii, 21; A. ii, 19; scales about 320 from shoulder to caudal base and 10 more on latter; about 270 predorsal scales; preorbital process to eye $3 \frac{2}{5}$ to 4 in rest of beak, width about equals its length; eye $1 \frac{4}{5}$ to 2 in postocular; interorbital $1 \frac{7}{8}$. Body subcylindrical. Caudal peduncle moderately compressed, width about half its least depth and $1 \frac{3}{5}$ to $1 \frac{7}{8}$ in eye. Head wide above, flattened sides moderately constricted below, width $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in postocular. Jaws not completely closing for at least basal third. Eye close to upper profile and combined with postocular $1 \frac{1}{2}$ to 2 in beak. Maxillary concealed, beyond eye front or half way in iris to pupil. Teeth fine in outer moderate band, and inner a row of well spaced larger canines. Triangular nasal cavity long as pupil. Interorbital level, with conspicuous median depression in front and few striae on surfaces of bones. Gill-opening forward to hind nasal cavity edge. Scales with 6 to 10 parallel circuli basally and as many apically, usually separated. Dorsal and anal naked, caudal base scaly. About 18 scales behind eye to preopercle ridge. Opercle naked. Lateral line without keel along caudal peduncle side. Dorsal origin at last third between preopercle ridge and caudal base, last dorsal rays extending well beyond latter. Anal origin opposite dorsal origin, only front rays longest. Pectoral $1 \frac{4}{5}$ to $1 \frac{5}{6}$ in head, measured from front of preorbital process. Ventral inserted nearly midway between eye

front and caudal base, $2 \frac{1}{5}$ in head.

Color in alcohol: brown on back. Sides and below silvery-white, also iris. Dorsal brown, blackish behind. Fins all pale brown. Length 155 to 188 mm. Two from the Hawaiian Islands.

A painting by Drayton, made at Tahiti, Sept. 1839, is based on an example 2 feet 2 inches long. *The last dorsal rays are not elongate but similar to the median rays.*

Strongylura auloceph Fowler and Bean.
Fig. 78.

Strongylura auloceph Fowler and Bean,
Proc. U. S. Nat. Mus., 63, 1923, p. 12.
Fiji or Samoa.

Drawing, without data, likely from the
type.

Strongylura fijiense Fowler and Bean.

Strongylura fijiense Fowler and Bean,
l.c., p. 13. Fiji.

Strongyloides subcapitata
control for practical work

Scombresocidae

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Scombresox equirostrum Le Sueur. Fig. 70.

Drawing 252 mm. long of an example from Valparaiso, said to be 4/5 natural size. It shows both mandibles of even length.

Scombresox saurus (Walbaum). Fig. 71.

Painting of an example from the Boston Market. Oct. 28, 1869.

Hemiramphidae.

Hyporhamphus kronei Ribeiro. Fig. 63.

Drawing of example, ^{200 mm. long} ~~about same size~~, from Rio Janeiro.

Hyporhamphus salvatoris Fowler and Bean,
Hyporhamphus salvatoris Fowler and Bean,
Proc. U. S. Nat. Mus., 63, 1923, p. 9. Rio
Janeiro, Brazil.

Hyporhamphus regularis (Gunther). 729-64.

Head $4\frac{1}{2}$ to $4\frac{2}{3}$; depth $8\frac{1}{6}$ to 9; D. ii, 13; A. ii, 14 or 15; scales 56 to 60 from shoulder to caudal base medially and 7 or 8 more on latter; 36 to 39 predorsal scales to head; 6 or 7 scales above lateral line to dorsal origin; snout $2\frac{4}{5}$ to 3 in head; eye $3\frac{1}{5}$ to $4\frac{1}{3}$; maxillary $3\frac{2}{3}$ to 4; interorbital $3\frac{1}{2}$ to 4; combined eye and postocular region 2 in beak. Body well compressed. caudal peduncle compressed, least depth $1\frac{1}{4}$ to $1\frac{1}{2}$ its length or $3\frac{3}{4}$ to 4 in head. Head width $2\frac{3}{4}$ to 3 in its length. Snout length about $\frac{4}{5}$ its width. Eye large, hind pupil edge midway in head. Maxillary largely concealed, apparently not to nostril, which is close before eye above. Teeth fine, in bands in jaws, extend on front of maxillary though not visible in its profile. Interorbital level. Preorbital elongate, entire, rhomboidal, depth $\frac{3}{5}$ its length. Scales with 3 to 5 basal marginal radiating striae, circuli basally moderate; in young fine and vertically parallel apically, absent apically in adult. Dorsal origin nearer caudal base than ventral origin. Anal similar, opposite. Pectoral moderate, $1\frac{2}{5}$ to $1\frac{1}{2}$ in head. Ventral origin midway between hind eye edge and caudal base, fin $2\frac{3}{5}$ in head.

Color in alcohol: faded brownish. Side with narrow whitish line, evidently silvery-white in fresh material, extends from shoulder to caudal base medially; expanded about equal to pupil width below front of dorsal. Sides of head with silvery reflections. Length 111 to 245 mm. (beak and tail damaged). Two from Sydney.

Fowler has noted Australian examples of Hemiramphus intermedius Cantor with scaly dorsal and anal fins.³⁶ Also, though Gunther has described Hyporhamphus regularis with the same fins scaleless³⁷, our specimen, on the contrary, shows them with fine scales. The greater portion of the caudal is also more or less covered with small scales. Hemiramphus intermedius further differs in its preorbital only long as deep and ventral inserted little nearer caudal base than pectoral origin. Also the movable portion of the upper jaw is longer than broad.

36 Proc. Acad. Nat. Sci. Phila., 1919, p. 7, Victoria.

37 Cat. Fish. Brit. Mus., vol. 6, 1866, p. 261, Port Jackson.

Hemiramphus intermedius Cantor. 75g. 65.

Head $4 \frac{4}{5}$; depth $8 \frac{4}{5}$; D. ii, 14; A. ii, 16; scales 55 from shoulder to caudal base medially; 40 predorsal scales; 8 scales above lateral line to dorsal origin; snout $2 \frac{2}{5}$ in head; eye $4 \frac{7}{8}$; maxillary $2 \frac{4}{5}$; interorbital $3 \frac{2}{3}$. Body subcylindrical. Caudal peduncle compressed, least depth $1 \frac{2}{3}$ its length or $4 \frac{3}{4}$ in head. Head width 3 in its length. Snout elongate, depressed, width $1 \frac{1}{2}$ its length. Eye close to upper profile, midway in head length. Mouth rather long, gape $\frac{2}{3}$ to eye. Maxillary largely concealed, nearly vertical, about reaches nostril. Teeth fine, in rather narrow bands in jaws, extend down on front half of maxillary and visible in its profile. Interorbital

slightly convex. Preorbital deep as long, length $1\frac{1}{2}$ in eye, with 2 vertical grooves. Gill-rakers 9 - 20, lanceolate, $1\frac{1}{2}$ in filaments, and latter $1\frac{1}{2}$ in eye. Scales narrowly imbricated, mostly adherent, larger with 1 to 4 basal striae; rather coarse parallel basal circuli, apically smooth; smaller scales non-striate, with parallel basal and apical circuli incomplete or sometimes connected below, or apical often very fine. Dorsal origin about midway between ventral origin and twelfth branched dorsal ray base. Anal opposite, similar, Pectoral (damaged) about $1\frac{3}{4}$ in head. Ventral inserted little nearer caudal base than pectoral origin, about 3 in head.

Color in alcohol: dull brownish generally, faded. Silvery-white narrow band from shoulder to caudal base medially, expanded $\frac{3}{5}$ vertical eye-diameter between front of dorsal and anal. Sides of head and iris with silvery reflections. Length 300 mm. (beak and caudal damaged). New Zealand. According to the painting by Drayton, Bay of Islands, March 1840.

We also examined 3 Australian examples in the Academy, which show: Head 5 to $5\frac{1}{8}$; depth $9\frac{1}{6}$ to $9\frac{4}{5}$; D. ii, 14; A. ii, 17 or 18; scales very caducous, mostly fallen and pockets not distinct; snout $2\frac{1}{2}$ to $2\frac{3}{5}$ in head; eye 4 to $4\frac{1}{3}$; maxillary $2\frac{7}{8}$ to 3; interorbital $3\frac{3}{5}$ to 4; eye and postocular $2\frac{1}{4}$ to $2\frac{3}{4}$; Gill-rakers 9 or 10 - 21 or 22. Scales with 8 to 10 short basal marginal striae, but no central circuli. Dorsal origin about midway between ventral origin and last dorsal ray base. Caudal well forked, lower lobe but little longer than upper, $1\frac{1}{4}$ in head; pectoral $1\frac{3}{5}$

to $1 \frac{2}{3}$. Ventral inserted, as in New Zealand example, varying to midway between middle of pectoral and caudal base.

Color in alcohol: back olivaceous, each scale edged darker. Lower surface of body whitish with silvery tints. Silvery lateral band broadly edged above with obscure plumbeous streak. Dorsal and anal dusky marginally, cream-colored basally. Caudal dusky-olive, dull dusky marginally. Beak dusky. Length about 328 to 368 mm.

Though Waite lists this species as Hyporhamphus intermedius³⁸ it can hardly be admitted to that genus as the posterior insertion of the ventrals, notwithstanding its subcylindrical, form renders it close to the Balaos, or Hemiramphus.

Hemiramphus marginatus (Forsk.) *Fig. 66.*

Head $4 \frac{2}{5}$; depth $6 \frac{3}{4}$; D. ii, 11; A. ii, 9; Scales 51 from shoulder to caudal base medially and 5? more on latter; 34 predorsal scales; snout 3 in head; eye $3 \frac{1}{2}$; maxillary 3; interorbital $3 \frac{3}{5}$. Body moderately long, well compressed. Caudal peduncle long as deep, moderately compressed, least depth $3 \frac{1}{4}$ in head. Head with flattened sides approximate below, width $2 \frac{3}{4}$ its length. Snout depressed, flattened, length $\frac{1}{2}$ its width. Maxillary mostly concealed, not quite to front nostril. Teeth fine, in narrow bands in jaws. Nostrils close before eye above, together, just before eye. Interorbital flat. Preorbital long as deep, Gill-rakers 9 - 20, lanceolate, about $\frac{2}{3}$ of filaments, latter 2 in eye. Scales largely adherent, with 3 to 5 basal

striae; basal circuli much coarser than apical. Dorsal origin

38 Records of Canterbury Mus. Vol. 1, No. 1, 1907, p. 15.

about midway between ventral origin and last dorsal ray base. Vent little behind dorsal origin and anal origin about opposite first third in dorsal base, or little nearer ventral origin than caudal base, fin small. Pectoral $1 \frac{2}{5}$ in head. Ventral inserted about last fifth in depressed pectoral length and caudal base, fin reaching $\frac{3}{4}$ to anal. Caudal (damaged) evidently forked.

Color in alcohol: brownish. Broad silvery band, about $\frac{2}{3}$ of eye width at its greatest expansion which is between dorsal and anal. Fins all brown. Length 115 mm. (caudal and beak damaged) Though listed from "Sydney", which is likely erroneous, the original label gives Tongatabu. Richardsons figure also gives Tongatabu.

This species is a native of the Indian ocean, from the Red Sea to the East Indies, It has not been recorded from Polynesia, so that its occurrence in the Tonga Islands is interesting. Hemirhamphus welsbyi Ogilby³⁹ is apparently allied in squamation, though its dorsal and anal are said to be scaleless. It has 12 or 13 anal rays.

39 Proc. Roy. Soc, Queensland, vol. 21, 1908, p. 91. Queensland.

Hemiramphus far (Forsk.) *Fig-66.*

Head $4\frac{1}{4}$ to $4\frac{3}{4}$; depth $5\frac{1}{2}$ to 9; D. i, 11 or 12; A. i, 9 or 10; Pectoral i, 10; V. i, 5; scales 48 to 52 from shoulder to caudal base; snout $2\frac{4}{5}$ to 3 in head; eye $3\frac{2}{5}$ to 4; preorbital length $6\frac{1}{5}$ to 7; interorbital $3\frac{1}{8}$ to $3\frac{7}{8}$. Body well compressed, lower profile more convex than upper. Caudal peduncle compressed, long as deep, least depth 3 to $3\frac{1}{8}$ in head. Head with flat sides well constricted below, width $2\frac{2}{5}$ to $2\frac{3}{5}$ its length. Snout blunt, about long as wide, width $1\frac{7}{8}$ its length. Eye slightly advanced, $1\frac{2}{5}$ to $1\frac{1}{2}$ in postocular. Eye combined with postocular about $2\frac{2}{5}$ in beak. Maxillary vertical, almost concealed, about to nostril, which is close ^{to} before eye. Teeth fine, in bands in jaws, few extend on front of maxillary inside and are not visible in profile of latter. Interorbital widely convex. Gill-rakers 8 or 9 - 22 to 24, lanceolate, $1\frac{1}{2}$ in filament and latter about $1\frac{3}{4}$ in eye. Scales largely adherent, narrowly imbricate; basal striae 1 to 3; fine circuli parallel and terminal about 100; vertical fins finely scaled. Dorsal origin slightly before first third in space between ventral origin and caudal base, first branched ray $1\frac{2}{3}$ to 2 in head. Anal similar but smaller, inserted slightly before middle in dorsal, though nearer caudal base than ventral origin, first branched ray $3\frac{1}{2}$ to $3\frac{2}{3}$ in head. Caudal deeply forked, lower lobe longer or about long as head. Pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$ in head. Ventral inserted slightly nearer end of depressed pectoral than caudal base, slightly more forward in younger examples. Two

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listed without locality, but according to the original label from Fiji, and one from Samoa.

Besides the above we include a series of examples in the Academy from Zanzibar, the Philippines and Sumatra, the largest 356 mm. long. When freshly received in arrack the Sumatran examples were pale brownish on upper surface and whitish or more or less silvery below. Scale edges on back mostly broadly dusky. Lateral silvery-white band from shoulder to caudal base medially expands between dorsal and anal until about half of vertical eye-diameter. Along side 5 dusky or blackish vertical blotches or bands. Beak and top of head dusky, Dorsal and caudal slightly dusky, also pectoral, and other fins pale. Most of the other examples all faded dull brown, with only pale lateral band evident.

Hemiramphus brasiliensis (Linnaeus). Fig. 67.
depauperatus Lay and Bennett.
Drawing of Hawaiian example by Richardson.

Hemiramphus laticeps Günther. Fig. 68.

Figure without data. It agrees in many ways with Gunthers description.

Euleptorhamphus longirostris (Cuvier). 75.69.

Head 7; depth $12\frac{1}{2}$; D. ii, 22; A. ii, 20; P. I, 9; V. i, 5; scales (pockets) 125 from shoulder to caudal base; 78 scales (pockets) before dorsal; 11 scales transversely from dorsal to anal origins; snout $2\frac{7}{8}$ in head; eye $3\frac{1}{4}$; maxillary $3\frac{2}{5}$; interorbital $3\frac{1}{2}$. Body strongly compressed, Least depth of caudal peduncle half its length or $5\frac{1}{2}$ in head. Head well compressed, width 3 in its length, flattened sides well constricted below. Snout width $1\frac{1}{2}$ its length. Eye slightly impinging on upper profile, slightly advanced or center about last third in ellipsoid pupil. Maxillary largely concealed, about to front nostril. Teeth fine, in narrow bands in jaws, extending down on maxillary edge. Combined eye and postocular at least 3 in beak (damaged). Interorbital concave. Preorbital depth about $\frac{3}{4}$ its length. Gill-rakers 7 - 22, lanceolate, 2 in filaments, which are 2 in eye. Scales all fallen. Dorsal inserted slightly behind last third in space between snout tip and caudal base. Anal similar, only inserted slightly behind dorsal origin. Pectoral (damaged) at least when extended forward reaches snout tip. Ventral long as eye, inserted much nearer caudal base than pectoral origin.

Color in alcohol: faded dull brown, with traces of bright silvery-white on sides and below. Fins all pale. length about 400 mm. (beak and caudal tips damaged).
Hawaiian Islands.

Jordan and Evermann describe the interorbital as flat, the head naked and dorsal inserted apparently little more

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posterior.⁴⁰ As stated above our example shows the interorbital decidedly concave, and the head with traces of scales. Compared with the Atlantic form, as represented in the Academy by an example from Atlantic City, N. J., we find no characters of specific value. The Atlantic City example shows Gill-rakers 8 - 25. Its scales have unconnected vertical parallel circuli, 20 to 26 basally and 100 to 120 apically, and sometimes basal groove medianly on edge. Thus Gunther's contention of a single species would seem established.⁴¹

40 Bull. U. S. Fish Comm., vol 23, pt.1, 1903 (1905).p. 128, fig. 43.

41 Journ. Mus. Godeffroy, vol. 16, 1909, p. 358.

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Exocoetidae.

Evolantia microptera (Valenciennes).

Head $4\frac{1}{2}$; depth $6\frac{1}{2}$ D. i, 13; A. i, 13 or 14; P. i, 12; scales 48 to 52 from shoulder to caudal base medially and 5? more on latter; 33 or 34 predorsal scales to head; snout $4\frac{1}{8}$ in head from upper jaw tip; eye 4; maxillary $4\frac{2}{5}$; interorbital $3\frac{1}{4}$. Contour elongately fusiform, moderately compressed. Caudal peduncle well compressed, least depth $1\frac{1}{5}$ to $1\frac{1}{4}$ its length or about $3\frac{1}{2}$ in head. Head compressed, width half its length. Snout conic, little broader than long. Eye not touching upper profile, hind edge slightly behind middle in head length. Mouth small, gape short; mandible slightly protruded. Teeth fine, in narrow bands in jaws. Maxillary largely concealed, not quite to nostril. Interorbital level. Gill-rakers 9 - 21, finely lanceolate, about $\frac{2}{3}$ of filaments and latter $1\frac{2}{5}$ in eye. Scales adherent, with 1 to 3 short close set marginal striae, or none; circuli fine, vertically parallel and only central incomplete or imperfect. Dorsal origin slightly behind last third between pectoral origin and caudal base, or little advanced in smaller example. Anal opposite dorsal, lower. Caudal well forked, lobes slender, lower longer, slightly less than pectoral. Pectoral half way to dorsal. Ventral inserted slightly nearer caudal base than pectoral origin, about midway in smaller example, fin reaching half way to anal.

Color in alcohol: back brownish, edge of each scale pocket mostly dusky, where each scale has fallen. An underlaid leaden tinge from pectoral to caudal base. Sides and below pale, with silvery reflections, especially on head.

Fins all pale brown. Pectoral with upper median rays dusky entire extent. Length 150 to 168 mm.

The Wilkes example is labeled from the Phoenix Coral Group, and as obtained from the stomach of a gannet (*Sula*). Curiously also an example in the Academy, which we include above, was obtained from a gannet's stomach captured in June 1875, 150 miles south of the Revillagigedo Islands.

Parexocoetus brachypterus (Richardson). *Fay. 61.*

Head $4 \frac{2}{3}$; depth $5 \frac{5}{6}$; D. 1, 12; A. 1, 13; P. 1, 12; scales (pockets) 48 from shoulder to caudal base medially and 4 more on latter; 26? predorsal scales (pockets) to head; 7 scales (pockets) above lateral line to dorsal origin; snout 4 in head from upper jaw tip; eye $2 \frac{2}{3}$; maxillary $3 \frac{1}{3}$; interorbital 3; mandible $2 \frac{4}{5}$ in head measured from its own tip. Body moderately compressed, caudal peduncle well compressed, about twice long as deep. Head width $1 \frac{7}{8}$ its length. Snout length $\frac{4}{5}$ its width. Eye large, hind pupil edge about midway in head length. Mouth small, lower jaw protrudes and with short firm point in front at symphysis. Maxillary rather evenly curved, well inclined and protractile, partly concealed though reaches eye. Narrow band of minute obsolete teeth in each jaw; band of similar ones across vomer. Nostrils small, together, close before and above eye. Interorbital broad, flat, Gill-rakers 7 - 19, lanceolate, about $\frac{1}{2}$ of filaments and latter about 2 in eye. Scales all fallen,

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except few in l. l. Dorsal origin at last third between hind eye edge and caudal base, depressed fin nearly reaching caudal base. Anal origin opposite dorsal origin. Pectoral extends back not quite to dorsal or about $1\frac{3}{4}$ to caudal base. Ventral inserted about midway between hind eye edge and caudal base, reaches vent, which close before anal.

Color in alcohol: grayish on back, sides and below whitish with dilvery tinge, especially lower sides of head and iris. Fins faded or pale brown. Length 155 mm. (caudal tip damaged). Hawaiian Islands. The uncolored plate says Lahaina, Sandwich Islands. Rev. M. Richards.

Compared with a Hawaiian example in the Academy, collected by J. K. Townsend, we find the latter with slightly longer pectorals, doubtless due to preservation, and reaching second branched dorsal ray base at least. It further shows: Head $4\frac{2}{5}$; depth $5\frac{1}{2}$; D. 1, 11; A. 1, 12; P. 1, 12; scales (pockets) 45, from shoulder to caudal base medially and 5 more on latter; predorsal scales 27 to head; snout 4 in head measured from upper jaw tip; eye 3; maxillary $3\frac{4}{5}$; interorbital 3. Gill-rakers 7 - 17. Teeth distinct. Scales with 5 to 7 basal striae; circuli fine and even. Depressed dorsal reaches back beyond caudal edge, at least far as limit of squamation on caudal base and apex of fin blackish. Length 170 mm.

Gunther unites Exocoetus hillianus Gosse.³⁴ We have compared 2 examples representing Gosse's fish from Santo Domingo, which are undoubtedly identical with Parexocoetus mesogaster (Bloch), as also represented in the Academy by an example

from Newport, Rhode Island. The Santo Domingo example shows: Head 4 to $4 \frac{1}{5}$; depth $5 \frac{1}{4}$ to $5 \frac{1}{3}$; D. i, 11 or 12; A. i, 12; P. i, 11 or 12; scales (pockets) 38? from shoulder to caudal base; predorsal scales (pockets) 23 or 24 to head; snout $3 \frac{2}{3}$ to 4 in head from upper jaw tip; eye $2 \frac{1}{4}$ to 3; maxillary $3 \frac{1}{3}$ to $3 \frac{3}{5}$; interorbital $2 \frac{2}{5}$ to $2 \frac{1}{2}$. Gill-rakers 8 or 9 - 22 or 23. scales with 4 convergent basal striae; the Newport example shows 3 or 4; circuli in all complete. Length 113 to 117 mm.

P. mesogaster may therefore be provisionally separated on account of the increased gill-rakers on the lower part of the first arch 22 or 23, compared with 17 to 19 in P. brachypterus.

34 Journ. Mus. Godeffroy, vol. 16, 1909, p. 362.

Exocoetus volitans Linnaeus.

On the plate, showing a poor dorsal view is "South Pacific Ocean. Lat. $26^{\circ} 7'$ Long. $174^{\circ} 20'E$. April 18, 1840." This specimen reported not in the collection, though 2 others are said to be. One is said to be from between Sunday Island and Tonga, and the other from near Rora Island.

Cypselurus furcatus (Mitchill). *Fig. 62.*

Two colored figures on plate, from off Cape Frio near Rio Janeiro.

Cypselurus oligolepis (Bleeker).

An outline sketch of an example obtained at Manila. The accompanying data are Exocoetus brachysoma Bleeker, 2 specimens.

Cypselurus bahianus Ranzani.

Sketch by Drayton of example not preserved and without other data than "October 1838."

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^A
GODIDAE.

Microgadus proximus (Girard).

Head $4 \frac{1}{8}$ to $4 \frac{2}{5}$; depth $4 \frac{7}{8}$? to $5 \frac{3}{5}$; D.I, 12 - 15
or I, 15 - III, 19 or V, 16; A. III, 17 or III, 23 - III, 19;
about 150 rows of scales along and above lateral line to caudal
base; 17 scales above lateral line to first dorsal origin; 24
predorsal scales to occiput; snout $2 \frac{7}{8}$ to $3 \frac{1}{8}$ in head; eye
 $4 \frac{7}{8}$ to $5 \frac{2}{5}$; maxillary $2 \frac{1}{4}$ to $2 \frac{1}{3}$; interorbital $3 \frac{3}{5}$ to
 $3 \frac{3}{4}$; head width $2 \frac{1}{10}$. Snout convex, length equals its width.
Hind eye edge midway in head length. Maxillary to pupil; expanse
ion 2 in eye. Bands of simple conic teeth in vomer and in jaws,

outer row of latter slightly enlarged. Scales with about 40 of which irregular radiating striae, about half incomplete; 40 to 45 basal circuli and about half as many apically. Color in alcohol dull brownish above, mostly uniform, and lower surface including anals and ventrals, paler to whitish. Length 250 to 254 mm. Two from Puget Sound.

Phycis latus (Ribiero).

Head $4 \frac{1}{6}$; depth $5 \frac{3}{5}$; D.VIII - 57; A. 47; scales in 123 rows along lateral line to caudal base; 12 scales above lateral line to soft dorsal origin; 38 below to anal origin, 62 predorsal scales (until opposite nostrils); snout $3 \frac{1}{2}$ in head; eye $5 \frac{7}{8}$; maxillary 2; interorbital $4 \frac{1}{2}$. Head width 2 in its length. Snout conic, length $\frac{2}{3}$ its width. Eye with hind edge advanced from head center. Mouth large, lower jaw shorter. Maxillary extends slightly beyond eye, expansion $1 \frac{1}{4}$ in eye. Teeth simple, conic, in bands in jaws and on vomer. Interorbital broadly convex. Rakers 37-41?, lanceolate, $1 \frac{1}{3}$ in filaments, which $1 \frac{1}{5}$ in eye. Scales cycloid, circuli 20 to 28, not joined medially basally. Filamentous first dorsal ray $3 \frac{1}{8}$ in total length of fish; filamentous ventral ray 2 in combined head and trunk. Color in alcohol pale uniform brown. Length 220 mm. Rio Janeiro.

Physiculus bachus (Schneider).

Head $3 \frac{4}{5}$; depth $5 \frac{1}{2}$; D. XII - 40; A. 36; scales in about 107 rows in lateral line to caudal base; 12 scales above lateral line to soft dorsal origin; about 21 scales below lateral line to anal origin; 63 predorsal scales; snout $3 \frac{3}{5}$ in head;

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eye $4 \frac{1}{3}$; maxillary $1 \frac{9}{10}$; bony interorbital $4 \frac{1}{8}$; head width $1 \frac{5}{6}$. Snout convex, length $\frac{2}{3}$ its width. Bands of villiform teeth in jaws, none on mouth roof. Rakers $5+9$, lanceolate, $1 \frac{1}{3}$ in filaments, latter 2 in eye. Scales with rather simple coarse circuli, 25 to 30 coarser and fewer apically. Color in alcohol dull brown, sides and below pale and whitish. Fins all dull brown. Iris pale or whitish. Dusky blotch at pectoral origin, extending little over adjacent region. Length 305 mm. Near Loba, New Zealand.

This species is well figured by Waite.²⁹⁹

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Records Canterbury Mus., vol. 1, No. 3, 1911, p. 183, Pl. 31, fig. 1.

PLEURONECTIDAE.

Hippoglossina ~~macrops~~ *stomata* Eigenmann and Eigenmann. *Fig. 392.*
~~Steindachner.~~

Head 3; depth $2 \frac{1}{3}$; D. 66; A. 52; pores 72 in lateral line to caudal base; about 82 rows of scales along lateral line to caudal base; 28 rows of scales above lateral line; 40 rows below; snout 5 in head, measured from upper jaw tip; eye $4 \frac{1}{4}$; maxillary $2 \frac{3}{5}$; head width 4 in its total length. Maxillary oblique, to eye center; expansion $2 \frac{1}{5}$ in eye. Mandible protruding. Row of moderate conic teeth in each jaw, small, none canines; no teeth on mouth roof. Interorbital narrow bony ridge. Rakers $5+12$, lanceolate, 2 in filaments, which $1 \frac{2}{5}$ in eye. Scales ctenoid on left or

colored side; basal radiating striae on scales 12 to 14; strong apical denticles 15 to 17; scales of right or blind side cycloid, with 10 to 12 basal radiating striae and circuli of all moderate; arch of lateral line $3 \frac{7}{8}$ in straight section; 10 scales obliquely across cheek to preopercle angle. Color in alcohol largely dull uniform brown, paler to whitish on right or blind side. Length 167 mm. One labeled "Fiji", ^hType species previously only known from the type, which was said to have come from Mazatlan. Probably our ^{which}example may have been obtained in California?

~~Xystreus ribeiroi Fowler and Bean~~
Xystreus ribeiroi Fowler and Bean,
 Proc. U.S. Nat. Mus., 63, 1923, p. 26. Rio Janeiro.

Paralichthys brasiliensis (Ranzani).

Fig. 393.

~~Drawing of an example from Rio~~
~~Janeiro, by Richard~~

Comparison of the type of Xystreus
ribeiroi, and a drawing by Richard,
 shows that it is a synonym of
 the present species.

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Paralichthys californicus (Ayres). *Fig - 394.*

Head $3 \frac{1}{3}$; depth $2 \frac{2}{5}$; D. 72 to 77; A. 58 to 62; scales in 95 to 100 rows in lateral line to caudal base; 30 to 32 scales above lateral line; 38 below; snout $4 \frac{7}{8}$ to $5 \frac{1}{8}$ in head from upper jaw tip; eye $4 \frac{4}{5}$ to 5; maxillary $2 \frac{1}{8}$ to $2 \frac{1}{5}$; head width 4 to $4 \frac{1}{8}$ in total head length. Maxillary oblique to hind pupil edge; expansion $1 \frac{3}{4}$ to $1 \frac{4}{5}$ in eye. Mandible slightly protrudes. Row of conic teeth in each jaw, larger or more canine-like in each. Interorbital narrow bony ridge, $2 \frac{2}{3}$ in eye. Rakers 9+20, lanceolate nearly long as filaments, which $1 \frac{1}{2}$ in eye. Scales ctenoid on left or colored side; basal radiating striae 12 or 13; strong apical denticles 8 to 10; cycloid scales on blind or right side, with 9 to 12 radiating basal striae; circuli moderate; arch of lateral line $3 \frac{1}{2}$ to $3 \frac{2}{3}$ in straight section; 12 scales across cheek from eye to preopercle angle on ridge. Color in alcohol brown, much paler on right side. Length 93? to 110? mm. Two labeled "Fiji", doubtless from California? *Drawing of an example by Richard, apparently labeled Oregon.*

Paralichthys adspersus (Steindachner). *Fig - 395.*

Head $3 \frac{1}{4}$; depth $2 \frac{1}{10}$; D. 70; A. 57; scales in 102 rows in lateral line to caudal base; tubes 107 in lateral line to caudal base; 41 scales above lateral line; 50 below; snout, to upper eye, $4 \frac{1}{2}$ in head from upper jaw tip; eye 6; maxillary $2 \frac{1}{5}$; head width $3 \frac{3}{4}$ in total head length. Maxillary steeply inclined, hind edge reaching opposite hind pupil edge. Mandible very slightly protruded. Row of conic teeth in each jaw, larger and more conic-like forward; no teeth on mouth roof. Interorbital narrowly

convex, nearly half wide as horizontal eye-diameter. Rakers 8 17, lanceolate, $1 \frac{1}{8}$ in filaments, which equal eye. Scales ctenoid on left or colored side; basal radiating striae 12 to 17; apical denticles strong, about 12; scales of right or blind side cycloid with 17 or 18 basal radiating striae; arch of lateral line $4 \frac{1}{2}$ in straight section; 14 scales across cheek from eye to angle of preopercle ridge. Color in alcohol dull brown generally, right side pale. Length 163 mm. One without locality, probably from

Peru? Drawing of an example from Peru, by Richard.

Rhombosolea leporina Günther. Fig. 396.

Head $3 \frac{1}{2}$; depth $2 \frac{1}{3}$; D. 64; A. 44; scales 78 in lateral line to caudal base; 30 scales above lateral line medially and 42 about greatest number below; snout, to lower eye, $4 \frac{1}{2}$ in head from upper jaw tip; lower eye 7; maxillary $4 \frac{1}{6}$; head width $3 \frac{1}{4}$ in its total length. Maxillary nearly vertical, not quite reaching opposite upper eye; expansion 3 in eye. Mandible protrudes vertically. Broad band of fine teeth developed only on left or blind side. Interorbital narrow bony oblique ridge; width $2 \frac{1}{2}$ in upper eye. Rakers VI-XI, rudimentary, conic points, barely $\frac{1}{6}$ of filaments, which equal eye. Scales with 20 to 22 basal radiating striae; circuli fine; 12 scales across cheek from lower hind eye edge to preopercle angle; lateral line straight, complete; dorsals and anals scaleless and caudal scaly over basal half. Color in alcohol deep or dusky-brown on right side. Fins brown.

Left side pale brown, evidently whitish when fresh. Length 244 mm. One example, labeled "New Zealand".

Although the locality given according to the Museum Catalogue is New Zealand, ^{The painting by A. T. Agate is labeled} quite likely ~~the specimen was really~~ Bay of Islands, New Zealand, April 1840. ~~secured in Australia, perhaps at Sydney?~~ It agrees largely with Gunther's account, ²⁸³ except he says the right maxillary extends to the front edge of the eye.

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Cat. Fish. Brit. Mus., vol. 4, 1862, p. 460.

Parophrys vetulus Girard. *Fig. 397.*

Head $3\frac{1}{2}$; depth $2\frac{2}{5}$; D. 75?; A. 55; scales 120? in lateral line to caudal base; 48 scales above lateral line, 58 below, snout $5\frac{1}{2}$ in head; eye $4\frac{1}{3}$; maxillary $4\frac{1}{6}$; head width $3\frac{1}{5}$. Maxillary vertical, not quite to eye front; expansion $2\frac{4}{5}$ in eye. Mandible well protruded. Rather narrow band of short and somewhat blunt teeth in each jaw, little developed on right or colored side, and apparently no other teeth. Interorbital narrow; bony-oblique curved ridge, barely $\frac{1}{5}$ of upper eye. Rakers 4+12, lanceolate, about half of filaments, which $1\frac{1}{3}$ in eye. Scales fine, cycloid with 6 to 8 basal radiating striae; circuli large; lateral line straight, accessory branch about to middle of pectoral. Color in alcohol with dull brown on right side. Left side paler or whitish. Iris slaty. Length 83 mm. One labeled "Sandwich Islands".

Painting by Drayton labeled Puget Sound, May 1841. Also drawing by Richard, without locality.

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~~Although with evidently wrong locality, our specimen was more likely really obtained in Peru.~~ It agrees best with the later accounts of the species by Evermann and Radcliffe²⁸⁴ in the fewer gill-rakers and cycloid scales, though these authors say the scales are ctenoid. The scales, are, however, also more numerous in our specimen and this in agreement with P. adpersus (Steindachner).

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Bull. U.S. Nat. Mus., No. 95, 1917, p. 140.

Lepidopsetta bilineata (Ayres).

Head $3 \frac{1}{4}$; depth $2 \frac{1}{4}$; D. 67?; A. 54?; scales in 70 rows in lateral line to caudal base; 23 scales above lateral line, 30 below snout 5 in head from upper jaw tip to lower eye; eye 5; maxillary 4; head width $3 \frac{1}{6}$ in its total length. Maxillary oblique, reaches beyond front eye edge, though not quite to pupil; expansion $2 \frac{3}{4}$ in lower eye. Mandible well protruded. Teeth uniserial in jaws, compressed, rather obtuse, even and better developed on blind side. Interorbital narrow elevated bony ridge, width about $\frac{1}{3}$ of maxillary expansion. Scales not overlapping on head and front part of body, where many roughened with fine prickles in clusters of 6 to 20 or more; other scales cycloid; 8 rows of scales across cheek from eye to angle of preopercle ridge; curved section of lateral line moderate, $3 \frac{2}{5}$ in straight section; accessory branch $2 \frac{3}{4}$ in total head length. Color in alcohol umber-brown on right or colored side, left side paler. Length 205 mm? One, in poor condition, from Puget Sound.

Platichthys stellatus (Pallas). *Fig. 398.*

Head $2 \frac{7}{8}$; depth $1 \frac{4}{5}$; D. 58; A. 39; pores in lateral line about 65 to caudal base; snout 6 in head, from upper jaw tip to lower eye; lower edge $7 \frac{3}{4}$; maxillary $4 \frac{1}{5}$; head width 3 in its total length. Maxillary oblique, to front pupil edge of lower eye; expansion $1 \frac{4}{5}$ in lower eye. Mandible strongly protruded. Teeth uniserial, incisors in jaws, better developed on blind side. Interorbital convex, narrow, width 2 in eye. Scales strongly asperous, more or less separated; 4 or 5 irregular rows behind lower eye to preopercle ridge; prickles on blind side slightly fewer. Color in alcohol amber generally on left or colored side. Fins paler than body-color, with 5 blackish or dusky-brown transverse bars on dorsal, 3 on anal and 4 horizontally on caudal. Length 335 mm. One without locality, body skinned out, doubtless from Puget Sound. *Painting by Drayton*

labeled Discovery Harbor. Also drawing, without data, by Richard.

Platophrys manicus (Broussouet). *Fig. 399.*

Head $3 \frac{1}{4}$ to $3 \frac{2}{5}$; depth $1 \frac{5}{6}$ to 2; D. 100 to 102; A. 79 to 81; scales 91 to 92 in lateral line to caudal base; 44 to 46 scales above lateral line, 47 to 49 below; snout $3 \frac{3}{4}$ to $3 \frac{7}{8}$ to lower eye, in head; eye $5 \frac{1}{5}$ to $5 \frac{4}{5}$; maxillary 3; interorbital $2 \frac{2}{3}$ to 4; head width $3 \frac{5}{6}$ to $4 \frac{1}{8}$ in total head length. Maxillary nearly vertical to front edge of lower eye; expansion $1 \frac{2}{5}$ to 2 in eye. Mandible protrudes, especially bony symphyseal knob. Row of conic teeth in each jaw, slightly enlarged anteriorly, edges even; no teeth on mouth roof. Interorbital broad, level,

sloping up to well-developed supraorbital ridge forward and backward; front edge of each supraorbital ridge with strong blunt spine; blunt spine at snout tip; on colored side supraorbital and snout spines absent or obsolete in younger examples. Rakers ~~6~~+10 to 12, lanceolate, $1 \frac{1}{5}$ in filaments, which $1 \frac{2}{3}$ in eye. Scales imbricate; on left side with about 120 to 125 radiating striae, or 80 to 85 in smaller examples, of which half reach margin basally; 8 to 13 short apical denticles; circuli rather few, become wider spaced basally; scales of right side cycloid and striae more marginal; about a dozen scales across cheek from lower eye to middle or preopercle ridge; arch of lateral line $4 \frac{1}{6}$ to $4 \frac{3}{5}$ in straight section. In large example left pectoral prolonged $1 \frac{1}{2}$ to caudal base, only $1 \frac{7}{8}$ in head in young.

Color in alcohol light brown on left side, with numerous and very variable brown rings enclosing paler spots, very much smaller ones crowded out over vertical fins. Right side whitish, mostly mottled or speckled obscurely with grayish on head. Length 58

to 265 mm. One from Pomotou and two Hawaiian. *Two drawings by Richard, 1 labeled Muraena and the other Pomotou.*
Platophrys pantherinus (Rüppell). *Fig. 400.*

Head 3 to 4; depth $1 \frac{2}{3}$ to 2; D. 88 to 92; A. 65 to 70; scales in 91 to 95 rows along lateral line to caudal base, in 78 rows in young; 35 to 38 scales above lateral line, 42 to 46 below; snout, from upper jaw tip to lower eye, 4 to $4 \frac{1}{8}$ in head; eye 4 to $4 \frac{1}{4}$; maxillary $2 \frac{7}{8}$ to $3 \frac{1}{6}$; interorbital 4 to 6; head width $3 \frac{1}{3}$ to 4 in total head length. Maxillary nearly vertical,

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to front edge of lower eye, or to pupil in small example; expansion 2 in eye, 3 in young. Mandible slightly protruding, sometimes even with snout tip and bony symphyseal knob slight. Row of small conic teeth in each jaw, little enlarged anteriorly; no teeth on mouth roof. Interorbital concave; supraorbital ridges distinct but without spines or knobs. Rakers $0+6$, short, clavate, about half of filaments and latter slightly over half of eye. Scales on left side with about 68 to 70 radiating striae, of which greater number basally marginal; 11 to 14 rather long apical denticles; circuli fine; scales on right side cycloid, basal radiating striae about 48 to 53, otherwise similar; about 10 scales across cheek from lower eye to middle of preopercle ridge; arch of lateral line $4 \frac{1}{3}$ to $7 \frac{1}{5}$ in straight section.

Color in alcohol dull brown on left side, marked with very variable darker or lighter rings, mostly with pale centers. In smaller example pattern largely variable to finely and obscurely speckled. Right side pale or whitish, apparently uniform. Length 40 to 132 mm. Two Hawaiian, 2 from Maui, and 3 others without data likely from the same region?

SOLEIDAE.

Achirus lineatus(Linnaeus).

Head $3 \frac{1}{3}$; depth $1 \frac{3}{5}$; D. 50; A. 44; snout, to upper eye, 4 in head; upper eye $4 \frac{1}{4}$; maxillary $2 \frac{7}{8}$; pectoral $1 \frac{1}{3}$. Color in alcohol uniform brownish, paler on left side. Length 35 mm. Rio Janeiro.

Cynoglossus puncticeps (Richardson).

Head 4; depth $3 \frac{1}{4}$; D. 90; A. 75; scales 95 in median lateral line from head to caudal base; 18 scales above median lateral line to upper lateral line, 24 below; snout, to upper eye, $3 \frac{1}{2}$ in head; upper eye $7 \frac{1}{2}$; mandible to rictus $4 \frac{1}{2}$; head width $4 \frac{1}{2}$. Maxillary reaches far as hind eye edge. Teeth fine, simple, conic, band in each jaw on blind side. Interorbital level, width $1 \frac{2}{5}$ in upper eye. Scales with 13 to 14 basal radiating striae, edges strongly scalloped; apical denticles 15 to 20; scales on blind side with 3 or 4 radiating basal striae, edge more scalloped and fewer denticles 5 to 10; circuli fine; 25 scales behind eye to gill-opening. Color in alcohol brown, paler on right or blind side. Left side finely mottled or speckled with darker, also same along vertical fins basally. Length 103 mm. Manila.

Cynoglossus quadrilineatus (Bleeker). *Fay. 40/.*

Head $4 \frac{2}{5}$; depth $3 \frac{7}{8}$; D. 109; A. 89; scales 90 in median lateral line to caudal base; 15 scales above median line to upper lateral line, 22 below; snout, upper eye, $8 \frac{1}{3}$ in head, mandible to rictus 4; head width $4 \frac{1}{5}$. Maxillary about half an eye-diameter below lower eye. Teeth as band of small fine conic patch on blind or right side in each jaw. Interorbital level, about equals eye. No rakers. Scales with 34 to 36 basal radiating striae; 10 to 14 apical denticles, some much elongated on smaller scales about marginal regions; scales of

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blind or right side cycloid; 23 scales behind lower eye to gill-opening. Color in alcohol largely dull brownish, right side paler. Length 203 mm. One without locality, probably from the Philippines? *Drawing by Richard labeled Manila.*

Symphurus plagusia (Schneider).

Head $4 \frac{3}{4}$; depth $3 \frac{1}{3}$; D. 96; A. 80; scales 90 from above gill-opening to caudal base; 40 scales transversely at widest point; snout to upper eye, 5 in head; upper eye $7 \frac{3}{4}$; mandible from tip to rectus $4 \frac{3}{5}$; head width 4. Maxillary extends beyond blind pupil edge of lower eye, though not quite to hind eye edge. Band of fine teeth in each jaw on blind side. Interorbital less in width than pupil and front nostril in its front part. Scales with 21 to 23 radiating basal striae, edges finely scalloped; apical denticles 21 to 23, slender; circuli fine; alike on both sides. Color in alcohol uniform dull brown on left side, pale or whitish on right side. Length 105 mm. Rio Janeiro.

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BERYCIDAE.

Beryx affinis Gunther.

Head $2\frac{3}{5}$; depth $2\frac{1}{3}$; D. VII, 12, i; A. IV, 12, i; scales 43 in lateral line to caudal base and 4 more in latter; 6 scales above lateral line to spinous dorsal, 12 below to spinous anal; 24 predorsal scales; snout $4\frac{1}{5}$ in head from upper jaw tip⁸⁷; eye $2\frac{7}{8}$; maxillary $1\frac{1}{2}$; inter-orbital $3\frac{1}{8}$.

Body deep, greatly compressed; least depth of caudal peduncle $1\frac{2}{5}$ its length or $2\frac{7}{8}$ in total head length. Head deep, well compressed, width half its length. Snout convex, obtuse, length $\frac{3}{5}$ its width. Eye large, high, hind pupil edge about midway in head length. Mouth large, lower jaw protruding, Maxillary free, to hind pupil edge, expansion $1\frac{1}{4}$ in eye. Teeth fine, minute, in narrow bands in jaws, on vomer and palatines; several teeth at front of upper jaw and at mandibular symphysis slightly enlarged. Interorbital convex; each side of occipital region cavernous. Suborbitals all with short ridges, broad; preopercle ridge minutely serrated. 2 denticles at angle; preopercle edge minutely serrate below, hind edge mostly entire and 4 or 5 large denticles at angle; opercle with 2 spines

⁸⁷ In this and the next family the head is measured back to the hind edge of the opercular membrane and not the spines.

above its hind edge denticulate; interopercle edge entirely denticulated finely; strong suprascapular spine and edge above finely denticulate. Gill-rakers 13+22, finely lanceolate, nearly twice as long as filaments or $1\frac{1}{5}$ in eye.

Scales strongly adherent, ctenoid; apical denticles 25 to 35; circuli very fine. Spinous dorsal begins over last part of pectoral base, seventh spine about $2\frac{1}{8}$ in head; first branched dorsal ray $1\frac{4}{5}$; fourth anal spine $2\frac{1}{4}$; first anal ray $2\frac{1}{4}$; pectoral $1\frac{1}{5}$; ventral $1\frac{1}{2}$. Caudal forked deeply, rudimentary rays moderate, firm. In alcohol brassy brown generally, sides and below most bright. Fins brownish. Length 265 mm. (Caudal tips damaged). Sydney.

Holocentridae.

Corniger spinosus Agassiz.

Head $2\frac{2}{3}$; depth $2\frac{1}{4}$; D. XII, 14, 1; A. IV, 10, 1; scales 30 in lateral line to caudal base and 5 more on latter; 4 scales above lateral line to spinous dorsal, 9 below to spinous anal; 6 predorsal scales; snout 4 in head; eye $3\frac{2}{5}$; maxillary 2; interorbital 6.

Body deep, well compressed; least depth of caudal peduncle $1\frac{1}{5}$ its length or $3\frac{4}{5}$ in head. Head width $1\frac{4}{5}$ its length. Snout length $\frac{3}{4}$ its width. Eye high, hind edge about midway in head. Mouth oblique, jaws even. Maxillary little beyond hind pupil edge, expansion $1\frac{1}{3}$ in eye. Teeth minute, in bands in jaws, much narrower in palatines and small patch on vomer. Interorbital narrow, slightly convex. Each prenasal with 4 small spines directed forward; lower edge of suborbitals with 4 large spines, though first much smaller than others and all directed backward; preopercle angle with large spine and one close above and another close

below, all directed back; large opercular spine; all bones on head quite spinescent. Gill-rakers iii, 3+10, iii, lanceolate, about $1/5$ longer than filaments or $2-1/4$ in eye. Scales coarsely ctenoid; long apical denticles 14 to 16; basal circuli extremely fine; cheek with 4 rows of scales. Spinous dorsal origin about opposite that of pectoral, third spine $2-1/6$ in head; third anal spine $2-2/3$; pectoral $1-2/5$; ventral $1-2/3$. In alcohol largely pale uniform brownish. Length 168? mm. Rio Janeiro.

Myripristis adustus Bleeker. *Jacobus Cuvier. Fig. 79.*

Colored figure, ~~without data~~ from example obtained at Porto Praya, Cape de Verde.

Myripristis intermedius (Gunther).

Head $2-1/2$ to $2-3/4$; depth $2-1/6$ to $2-4/5$; D. X - I, 15, r; A. IV, 12, i or 13, i; scales 30 or 31 in lateral line to caudal base and 4 or 5 more on latter; 4 scales above lateral line to spinous dorsal, 6 or 7 below to spinous anal; 9 or 10 predorsal scales; snout $4-1/3$ to 5 in head from upper jaw tip; eye 2 to $2-1/3$; maxillary $1-2/3$ to $1-3/4$; inter-orbital 4 to $4-1/4$.

Body well compressed; least depth of caudal peduncle $1-1/4$ to $1-1/3$ its length or $3-3/5$ to $4-1/6$ in head total length. Head width $1-4/5$ to $2-1/8$ its length. Snout broad, obtuse, length about $2/5$ its width. Eye very large, slightly impinging on upper profile, hind pupil edge slightly advanced to center in head length, about midway in young. Maxillary little beyond hind pupil edge, terminal expansion $1-7/8$ to $2-1/5$ in eye. Teeth in villiform bands in jaws, on vomer and palatines; on outer face of each

premaxillary in front 3 and on each dentary close to symphysis 5 blunt enlarged teeth in largest examples, scarcely evident in half-grown and entirely absent in young. Mandible included slightly to distinctly protruded. Interorbital level. Opercular spine single. Gill-rakers i, 14+24, lanceolate, slender, nearly twice filaments or 2 in eye. Scales ctenoid; 21 to 26 marginal apical, denticles; basal circuli very fine and adults with 4 or 5 small basal lobes not present in young. Fourth dorsal spine 2 to 2-1/8 in head; third anal spine 2-1/6 to 2-1/3; pectoral 1-1/3 to 1-2/5; ventral 1-3/5 to 1-4/5. In alcohol largely pale uniform brownish generally, back with olive tints. Rather obscure pale brown bands follow each row of scales longitudinally. Hind opercular edge deeper brown, and blotch in pectoral axil large and still darker. Some examples show dusky about soft dorsal and anal ends. Eight from Samoa. Length 65 to 140 mm.

Also a small series in the Academy from Samoa agrees, though including specimens of but moderate and small size. The larger of these certainly show the dentition, especially the outer blunt teeth, in agreement. That M. sanguineus Jordan and Seale⁶⁸ is a synonym seems certain.

⁶⁸Bull. Bur. Fisher., U. S., vol. 25, 1905 (1906), p. 221, fig. 24, Apia and Tahiti.

Holocentrus punctatissimus Cuvier.

Head 3; depth 2-3/4; D. XI, 13, i; A. IV, 9, i; scales 44 in lateral line to caudal base and 3 more on latter; 4 scales above lateral line to spinous dorsal, 8 below to spinous anal; 8 predorsal scales; snout 4-1/3 in head; eye 2-3/4; maxillary 2-3/4; interorbital 3-1/8; about 2+5

developed gill-rakers; scales with 34 apical denticles and 4 basal striæ; length 135 mm. Ohau.

We have compared this example with the types of Holocentrus gladi-
spinis Fowler and H. gracilispinis Fowler, and find their characters
simply those of slight variation. The scales of most all show 4 basal
radii and 34 to 37 apical serræ.

Holocentrus diadema (Lacépède.

Head 3; depth 3; D. XI, 13, 1; A. IV, 9, 1; scales 46 in lateral
line to caudal base and 5 more on latter; 4 scales above lateral line to
spinous dorsal and 8 below to spinous anal; 9 predorsal scales; snout
4-1/4 in head; eye 2-1/3; maxillary 3; interorbital 4.

Body elongately fusiform, well compressed; least depth of caudal
peduncle 1-4/5 its length or 4 in head. Head width 2 in its length.
Snout obtuse, length 3/4 its width. Eye impinging on upper profile;
hind pupil edge about midway in head length. Jaws about even. Maxillary
slightly beyond front pupil edge, reaches about first third in eye. Bands
of villiform teeth in jaws and on vomer and palatines. Preorbital with
broad spine directed down. Interorbital slightly convex. Preopercle
spine about half of eye. Opercle with 2 spines, upper much longer. Gill-
rakers iv, 3+9, iv, lanceolate, equal gill-rakers or 3-1/3 in eye. Scales
with about 22 marginal apical denticles and 6 basal striæ; circuli very
fine. In alcohol brown generally, each row of scales in trunk with rather
narrow pale brown longitudinal band, narrowing behind to fine line.
Membranes of spinous dorsal dusky to blackish-brown, except narrow white
line, which low at first across first 3 membranes, then begins submargin-
ally above and continues back to end of fin. Membrane after third anal

spine blackish. Length 100 mm. Samoa?

This example agrees with a fine Hawaiian, Samoan and Philippine series in the Academy. As these are more recently preserved, they have retained more color, which quite contrasted in same. They show the pale longitudinal bands nearly whitish with dark bordering lines, white lines on spinous dorsal variable and tip of each membrane white.

Holocentrus sammara (Forsk^oal)

Head $2\frac{1}{2}$ to $2\frac{3}{4}$; depth 3 to $3\frac{2}{5}$; D. XI, 11 or 12; A. IV, 8; scales 38 to 42 in lateral line to caudal base and 3 to 5 more on latter; 4 scales above lateral line to spinous dorsal, 7 or 8 below to spinous anal; 6 to 8 predorsal scales; snout $3\frac{3}{5}$ to $4\frac{1}{4}$ in head from upper jaw tip; eye 2 to $2\frac{7}{8}$; maxillary $2\frac{1}{4}$ to $2\frac{2}{5}$; interorbital 4 to $4\frac{1}{4}$.

Body compressed, rather slender; least depth of caudal peduncle $1\frac{1}{2}$ to 2 in its length or $4\frac{1}{5}$ to $4\frac{1}{4}$ in total head length. Head width 2 to $2\frac{1}{5}$ in its length. Snout conic, length about $\frac{7}{8}$ to 1 its width. Eye very large, high and impinging in upper profile, hind pupil edge about midway in length from snout tip; eye center midway in young. Maxillary beyond front of pupil or about first $\frac{1}{3}$ to $\frac{2}{5}$ in eye; expansion $2\frac{1}{5}$ to $3\frac{3}{4}$ in eye. Bands of villiform teeth in jaws and on vomer and palatines. Interorbital slightly concave. Preopercle spine about $2\frac{3}{4}$ in eye; 2 opercular spines, upper often little longer. Gill-rakers v or vi, 1 or $2\frac{1}{2}$ or 7, v, about long as filaments or $3\frac{1}{4}$ in eye. Scales finely ctenoid; 15 to 34 small marginal apical denticles; 3 to 5 basal striae; circuli very fine; 5 rows of scales on cheek. Spinous dorsal about over pectoral origin, third spine $1\frac{7}{8}$ to $2\frac{1}{8}$ in head; third dorsal ray $1\frac{7}{8}$ to 2; third anal spine $1\frac{2}{5}$ to

1-1/2; pectoral 1-3/4 to 1-7/8; ventral 1-2/3 to 1-7/8.

Color in alcohol dull olive-brown above and on back, sides and below paler or brassy. Row of small dark brown spots forming longitudinal lines and one spot to each scale, following courses of scales. First 3 membranes of spinous dorsal with broad median dusky to blackish area, followed behind by much paler. Above this and below row of rather large whitish spots, as one near base of each membrane and another near margin. Membrane between third and fourth anal rays whitish. Each caudal lobe rather deeper brownish medianly than rest of fin. Length 42 to 170mm. Two from Samoa, 2 from Fiji and one from Tahiti. Of the Fiji examples, young, larger has the front dark dorsal blotch, which is absent in the smaller.

Besides these we have also compared Hawaiian. Samoan and Philippine material in the Academy. These all agree, especially in the pattern of color of the dorsal fin and in none is the black area continued beyond the fourth membrane. Their more recent preservation, however, shows that the front edge of both soft dorsal and anal are pale dusky. Five of the smaller Philippine lot are undoubtedly identical with the type of Flammeo achrom of terus Fowler.⁶⁹ A comparison leads to the conclusion of Kendall and Goldsborough.⁷⁰ Their scale structure in every way agrees.

⁶⁹ Proc. Acad. Nat. Sci. Phila., 1904, p. 236, fig. 6.

⁷⁰ Mem. Mus. Comp. Zool., vol. 26, No. 7, 1911, p. 265.

Holocentrus opercularis Valenciennes.

Head $2\frac{3}{4}$; depth $3\frac{1}{4}$; D. XI, II, i; A. IV, 9, i; scales 37 in lateral line to caudal base and 4 more on latter; 4 scales above lateral line to spinous dorsal, 6 below to spinous anal; predorsal scales 9; snout $3\frac{1}{4}$ in head; eye $3\frac{1}{4}$; maxillary $2\frac{1}{10}$; interorbital 5.

Body compressed, rather slender; least depth of caudal peduncle about 2 in its length or $4\frac{5}{6}$ in head. Head width $2\frac{2}{5}$ its length. Snout conic, long as wide. Eye long, high, impinging on upper profile, hind pupil edge midway in head measured from snout tip. Maxillary to middle of eye, expansion 2 in eye. Bands of villiform teeth in jaws, on vomer and palatines. Interorbital about level. Preopercle spine slightly less than half of eye; 2 rather wide-set equal opercular spines. Gill-rakers vi, ~~I~~7, v, slightly longer than filaments, or $2\frac{3}{4}$ in eye. Scales finely ctenoid, with about 32 small marginal apical denticles, 4 basal striae and circuli very fine; cheek with 5 rows of scales. Spinous dorsal origin about over pectoral origin, third spine $2\frac{1}{4}$ in head; second dorsal ray $2\frac{1}{4}$; third anal spine $1\frac{2}{5}$; pectoral $2\frac{1}{5}$; ventral $1\frac{7}{8}$.

Color in alcohol dull olive-brown, paler below, each row of scales with longitudinal paler bands, broader on costal region as scales are more deeply exposed. Spinous dorsal black, relieved by a row of marginal and another of whitish blotches. Other fins all pale uniform brownish. Length 135 mm. Samoa.

Holocentrus spinifer (Forsk.)^o

Head $2\frac{3}{5}$ to $2\frac{3}{4}$; depth $\frac{2}{5}$ to $2\frac{3}{4}$; D. XI or XII, 15, i, sometimes 14, i; A. IV, 9, i or 10, i; scales 39 to 46 in lateral line to caudal base and 3 to 6 more on latter; 4 or 5 scales above lateral line to spinous dorsal and 7 to 9 below to spinous anal; snout $3\frac{1}{2}$ to 4 in head

from upper jaw tip; eye $2\frac{1}{3}$ to 4; maxillary $2\frac{1}{6}$ to 3; interorbital 5 to $7\frac{1}{4}$.

Body compressed, deepest at ventral origin; least depth of caudal peduncle $1\frac{1}{3}$ to $1\frac{2}{3}$ its length or $3\frac{2}{5}$ to 4 in total head length. Snout conic, long as wide. Eye high, close to upper profile, posterior edge of pupil about middle of head, slightly advanced in smaller example. Maxillary to pupil or slightly beyond its front edge; expansion $1\frac{5}{6}$ to 2 in eye. Bands of villiform teeth in jaws, on vomer and palatines. Interorbital about level. Preorbital with broad spine directed below, followed by 3 to 5 small denticles and then a larger one in front of infraorbital; preopercle spine slightly longer than eye; posterior edge of preopercle finely denticulate; opercle with 2 spines, close-set or moderately spaced. Gill-rakers iv, 2 or $3+7$ or 8, v, lanceolate, about as long as filaments or 2 in eye. Scales finely ctenoid; 27 to 30 small marginal apical denticles; 2 to 4 basal striae; circuli very fine; cheek with 5 rows of scales. Spinous dorsal origin about last third between posterior edge of eye and pectoral origin; third spine 2 in head; second ray $1\frac{3}{4}$ to $2\frac{1}{6}$; third anal spine $1\frac{2}{3}$ to 2; pectoral $1\frac{1}{2}$ to $1\frac{2}{3}$; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Color in alcohol pale uniform brownish. Each row of scales with broad pale obsolete band. Fins all pale uniform brown. In young hind preopercle edge finely and evenly denticulate, becoming coarsely and unevenly so with age. Length 55 to 252 mm. One from Oahu and 3 from Samoa.

We have also compared Samoan and Thornton Island material, 65 to 208 mm. long, in the Academy, the former included above.

Gasterosteidae.

Gasterosteus cataphractus (Pallas). *Fig. 78a.*

Six from Oregon. Length 45 to 52 mm. These show the lateral plates quite variable, in one example 23, and in each of the others 5 to 10.

Syngnathidae.

Syngnathus rousseau Kaup. *Fig. 80 and 81.*

Head $2 \frac{1}{3}$ to $3 \frac{1}{8}$ to vent; depth 3 to 4; D. 25 to 31; A. 3; rings 17, once 18 - 32 or 33, once 27; snout $1 \frac{7}{8}$ to $2 \frac{1}{3}$ in head from upper jaw tip; eye $2 \frac{1}{2}$ to 3 in snout; pectoral $2 \frac{1}{5}$ to 3; caudal $1 \frac{1}{2}$ to $2 \frac{1}{2}$; interorbital 1 to $1 \frac{5}{8}$.

Body well compressed; upper keel each side of back to last fourth to sixth in dorsal fin length; this replaced below by similar parallel or upper caudal keel, beginning about first fifth to fourth in dorsal fin length; median lateral keel from pectoral axil midway along side, ends opposite where caudal keel begins; median ventral keel complete from breast to vent; lower lateral keel on each side from head to caudal fin uninterrupted. Head width $3 \frac{1}{2}$ to 5 in its length; upper profile concave. Snout about long as rest of head, much shorter in young. Eye moderate, large in young, also supraorbital keel. Mouth terminally superior.

Maxillary about half of eye. Interorbital concave, rostral keel extending within though much less developed than on snout. Opercle without keel, with many fine striae radiating above and below. Slight occipital keel medially, notched at each segment juncture. Gill-opening small slit, nearly or quite horizontal, 2 to 4 times its own length from pectoral origin. Rings firm, no spines on keel; each ring with many fine transverse striae. The brood pouch of the male extends over 12 to 15 rings. Dorsal origin begins usually well forward on second ring, before vent, and extends on five body rings. Anal nearly as long as eye, inserted on ring just behind vent. Caudal elongate. Color dull brown, faded in spirits, some dark specks and streaks on sides and above.

Four specimens from Rio Janeiro, 79 to 115 mm.

Compared with ten fine examples of S. pelagicus Osbeck, in the Academy collections from the Mediterranean, we find the following differences:- In S. rousseau the head is much smaller, body depth greater, dorsal rays fewer, body rings fewer, eye larger, dorsal beginning well before vent or at least on 2 body-rings, and male brood pouch on fewer rings or at least area long as rest of tail. Jordan and Evermann give the distinctions as fewer dorsal rays, or 29 to 32 for S. pelagicus,⁵² whereas all our examples show the lowest number 36. Moreover the head has a slightly stronger keel in S. rousseau. Our examples all show several more rings. The Academy specimens of S. pelagicus have: Head $2\frac{5}{8}$ to $2\frac{7}{8}$ to vent; depth $4\frac{1}{8}$ to $4\frac{1}{2}$ in head; D. 36 to 39; rings 19 to 22 - 35 to 43; snout $1\frac{1}{2}$ to 2 in head; eye 3 to $6\frac{2}{3}$ in snout; pectoral $2\frac{1}{2}$

to $4\frac{3}{4}$; caudal $1\frac{1}{8}$ to 3; interorbital $1\frac{1}{6}$ to $1\frac{4}{5}$ in eye. Broodpouch on 21 to 26 caudal rings. Length 112 to 345 mm.

Two examples in the Wilkes Collection from the "North Atlantic Ocean" have: Head $2\frac{5}{6}$ to $3\frac{1}{8}$ to vent; depth $2\frac{4}{5}$ to $3\frac{1}{8}$ in head; D. 28 to 33; A. 3; rings 19 - 32 to 34; snout $1\frac{4}{5}$ to $1\frac{7}{8}$ in head from upper jaw tip; eye 3 to $3\frac{1}{5}$ in snout; pectoral $2\frac{1}{5}$ to $2\frac{7}{8}$; caudal 2; interorbital $1\frac{1}{2}$ to $1\frac{3}{5}$ in eye; length 147 and 148 mm.

The original account of S. rousseau Kaup,⁵³ also the record for St. Lucia by Jordan,⁵⁴ agrees with our material.

52 Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 762.

53 Cat. Lophobr. Fish. Brit. Mus., 1856, p. 40, Martinique.

54 Proc. U. S. Nat. Mus., vol. 12, 1889, p. 647.

Syngnathus blainvillianus Eydoux and Gervais. *Fig. 82.*

Head (snout tip damaged) $3\frac{1}{8}$? to vent; depth $4\frac{1}{4}$; D. 32; rings 20 - 33?; eye $2\frac{3}{4}$ in postocular; interorbital $1\frac{1}{2}$ in eye.

Body greatly compressed, dilated medially with high trenchant back, profile forming an even curve from nape to caudal base; upper keel each side of back to last fourth in dorsal length; median lateral keel from pectoral axil midway along side extending upward below dorsal and then along upper caudal edge; median ventral keel complete from breast to vent; lower lateral keel on each side from below pectoral to caudal fin. Head width about $1\frac{1}{2}$ in postocular.

Slight rostral keel extends into front of interorbital; latter slightly concave; supraorbital keel slight, also occipital; opercle without keel. Gill-opening small horizontal slit, about its own length from pectoral origin. Gings firm. Keels without spines. Dorsal origin near middle of second ring before vent, rest of fin on 8 caudal rings. Anal very small, on ring just behind vent.

Color in alcohol: faded mostly uniform brownish. Length (damaged) at least 180 mm. One from Valparaiso.

Syngnathus acus Linnaeus. *Fig-83.*

Drawing of an example from the North Atlantic in Lat. 33° 13' N. Long. 49° 19' W. It is shown with D. 33, and is likely intended for this species.

Syngnathus pelagicus Linnaeus. *Fig-84.*

Drawing of an example from Orange Harbor, Tierra del Fuego. The dorsal view shows about 35 and the lateral view 25 rays in the dorsal fin. Evidently intended for the present species.

Corythoichthys haematopterus (Bleeker).

.Head 3 to $3\frac{1}{2}$ to vent; depth 3 to $3\frac{1}{2}$ in head; D. 29 to 31; rings 16 or 17 - 33 to 36; one abnormally 20 - 24; eye 2 to $2\frac{1}{4}$ in snout; pectoral $1\frac{1}{2}$ to 2; caudal 1 to $1\frac{3}{5}$.

Body about wide as deep; upper keel each side of back to last third or $\frac{2}{5}$ in dorsal length; median lateral keel from pectoral axil to first caudal ring midway along side, ends as upper caudal keel begins; breast and belly without median keel; lower lateral keel each side from head to caudal fin, uninterrupted; male with brood pouch over 13 to 15 caudal rings. Head width 3 to $3\frac{2}{5}$ its length. Snout little less than rest of head. Eye moderately large, edges of sockets conspicuous. Mouth terminally superior. Maxillary small, inconspicuous, about long as pupil. Interorbital concave, without keel. Rostral keel above slight, highest behind and ends close before eye. Opercle without keel and with many striae, mostly radiating below; high and conspicuous occipital keel with 2 notches at segment junctures. Gill-opening small horizontal slit, high, above pectoral origin eye-diameter or slightly more. Rings firm, without spines or keels and each with many fine transverse striae. Dorsal inserted entirely on caudal rings, begins usually at front of first and extends over 5 to 7. Anal rudimentary. Caudal rounded convexly behind.

Color in Alcohol: faded dull brownish, under surface slightly paler. Scattered obsolete darker brownish specks. Seven examples from Samoa, 72 to 98 mm. Color sketch by Drayton says Opolu, November 1839.

Corythoichthys mataafae Jordan and Seale.

Head $3\frac{1}{2}$ to vent; depth 2 in head; D. 22; rings 16 - 31; snout $2\frac{3}{4}$ in head; eye $1\frac{1}{2}$ in snout; pectoral $1\frac{2}{5}$.

Body moderately compressed; upper keel each side of back to last third in dorsal, replaced close below by similar parallel caudal keel beginning opposite dorsal origin; median lateral keel from pectoral axil, deflected below on first caudal ring to lower tail edge and then continued to caudal base; lower lateral keel each side of trunk ending on first caudal keel inferiorly; median ventral keel complete from head to vent. Head width $2\frac{1}{8}$ its length, upper profile strongly concave before eye. Snout much shorter than post-orbital, with median keel above and behind. Eye large, with conspicuous edge to sockets. Mouth terminally superior, small. Interorbital concave; head with strong keel below, but not extended behind eyes; opercle with median longitudinal keel, few striae above and many radiate below; slight occipital keel and small nuchal on first two rings. Gill-opening moderate slit, little inclined, about long as pupil and some distance above and little before pectoral origin. Rings firm, without spines on keels and each with fine transverse striae. Dorsal on first 5 caudal rings.

Color in alcohol: faded largely uniform deep brown.

Length 53 mm. One from Tongatabu.

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Solenognathus hardwickii (Gray). *Fig. 86.*

Head $3\frac{1}{2}$ to $3\frac{5}{6}$ to vent; depth $2\frac{1}{3}$ to 3 in head; D. 41 to 44; rings 26 or 27 - 52 to 56; snout $1\frac{2}{3}$ in head; eye $5\frac{1}{8}$ to $5\frac{1}{5}$ in snout; pectoral 3 to $4\frac{1}{6}$; inter-orbital $4\frac{1}{4}$ to $7\frac{1}{4}$. Body well compressed, depth quite expanded at last half or $2/5$; upper keel each side of back far as end of dorsal fin base; replaced below by similar parallel less distinct median lateral keel extending up at dorsal end continuously with upper caudal keel; lower lateral keel continuous with lower caudal keel; median ventral keel complete from breast to vent. Head width $5\frac{1}{4}$ to 6 in its length. Snout strongly compressed, edge not keeled above but median groove below; supraorbital with several knobs, also one at snout base above close before eye. Maxillary terminally superior, about 2 in eye. Interorbital well concave; no occipital keel though several rugose knobs; opercle rather coarsely striate. Gill-opening small slit about long as pupil and this about 3 times its length from pectoral origin. Rings quite firm, without spines or keels, each with few transverse and many reticulating striae. Dorsal entirely on front of tail, extending on 11 or 12 rings; tail end prehensile.

Color in alcohol: faded largely uniform brownish. Length 285 to 385 mm. Three examples. Though two labels are given, one China and the other "Rio Janeiro," the latter is undoubtedly erroneous. The original sketch gives Japan.

Hippocampus abdominalis Lesson.

Fig. 87 and 88. ♀

Head $2\frac{1}{4}$ to 3 to vent; depth of trunk $1\frac{1}{3}$ to $1\frac{1}{2}$ its length; D. 30 to 32; rings 12 - 49 or 50? (last few rings obsolete); snout $2\frac{1}{4}$ to $2\frac{7}{8}$ in head; eye $1\frac{2}{5}$ to 2 in snout; interorbital 2 in eye; length 147 to 225 mm.

Two from Australia.

The above agrees with H. agnesae Fowler.⁵⁵ which latter may be suppressed as a synonym, likewise H. bleekeri Fowler.⁵⁶ which on account of its short snout is undoubtedly the male.

55 Proc. Acad. Nat. Sci. Phila., 1907, p. 429, fig. 5. Victoria.

56 L. c., p. 427, fig. 4, Victoria.

Hippocampus punctulatus Guichenot.

Fig. 89 to 91.

Drawing^S of 3 examples from Rio Janeiro.

Hippocampus hystrix Kaup.

Fig. 92.

Head about $1\frac{1}{2}$ to vent; depth of trunk $1\frac{1}{2}$ in head; D. 18? rings 11 - 40? (last few on caudal indistinct); snout (end damaged) about $1\frac{3}{4}$ in head; eye 4? in snout; interorbital $1\frac{1}{2}$ in eye.

Body strongly compressed, keels all distinct; rostrum cylindrical; interorbital concave, strong spine medially in front and one above each eye; very slight preocular knob; strong postocular and another infraocular spine, also 3 on each shoulder-girdle; strong median occipital spine before coronet which formed of pair of spines each side, and temp-

oral spine each side below median occipital; all body spines well developed, especially along entire dorsal and lateral ridges, scarcely evident on median ventral ridge, obsolete or disappearing on lower caudal ridge behind. Dorsal on last 2 body rings and first 2 caudal rings.

Color in alcohol: largely uniform brown. Length about 205 mm. Japan?.

This example agrees in most every way with Kaup's account and figure. The species appear quite aberrant in its numerous spines. H. erinaceus Gunther⁵⁷ differs only in snout shorter than rest of head, and was founded on a much smaller specimen.

57 Cat. Fish. Brit. Mus., vol. 8, 1870, p. 206, No locality.

Aulostomidae.

Aulostomus valentini (Bleeker).

Head $2 \frac{3}{5}$ to $2 \frac{5}{6}$; depth 1 to $1 \frac{1}{2}$ in postocular; D. X or XII, 27 to 30; A. 27 to 29; scales 240 to 245 in lateral line to caudal base and 15 to 18 more on latter; 21 or 22 scales above 1. 1. to dorsal origin, 20 or 21 below to anal origin; 30 to 36 predorsal scales to occipital plate; snout $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in head from its own tip; eye $8 \frac{4}{5}$ to $10 \frac{1}{2}$; maxillary $5 \frac{2}{3}$ to $7 \frac{1}{4}$; interorbital 11 to $12 \frac{1}{4}$. Body well compressed, oblong, narrow; caudal peduncle $2 \frac{1}{5}$ to $2 \frac{2}{3}$ in snout. Head strongly compressed, width 2 to $2 \frac{1}{8}$ in postocular. snout strongly compressed, depth $2 \frac{4}{5}$ to $4 \frac{1}{5}$ in its length. Eye center about last fourth to two sevenths in head. Lower jaw well protruded. Symphyseal barbel about half of eye. Maxillary expansion $1 \frac{1}{2}$ to $1 \frac{2}{5}$ in eye. No teeth. Interorbital rather narrow, with rather deep depression in middle. Gill-opening forward about to front pupil edge. scales regular, minute, basal striae 1 to 4, apical denticles 10 to 20, circuli moderate. Suborbitals, opercle and cranium with fine striae. Dorsal inserted about last fourth between

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hind eye edge and caudal base, or slightly advanced in young, front rays elevated. Anal similar, opposite. Pectoral $3 \frac{1}{3}$ to $4 \frac{1}{4}$ in snout, ventral 5.

Color in alcohol: dull brown. Black spot at snout tip, on middle of maxillary, usually at ventral base below, anal origin, middle of upper and lower caudal lobes, Blackish streak usually along base of dorsal and anal. Length 192 to 343 mm. Oahu.

We also include 5 Hawaiian examples in the Academy, besides one labeled Pacific Ocean, received from J. K. Townsend and also likely Hawaiian?.

Fistulariidae.

Fistularia petimba Lacepede.

Head $2 \frac{2}{5}$ to $2 \frac{2}{3}$; depth $9 \frac{1}{4}$ to 13 in head; D. 14 to 16; A. 14 or 15; P. 13 or 14; V. i, 5. Body greatly depressed, smooth, depth about $\frac{3}{5}$ to $\frac{2}{3}$ its greatest width, which is about midway in length. Head width $1 \frac{2}{5}$ to $1 \frac{4}{5}$ in postocular. Snout depressed, each lateral ridge well serrate antrorsely for at least basal half to $\frac{3}{5}$, in larger examples more serrae and closer anteriorly, and distinct as viewed from above; combined eye and postocular $2 \frac{4}{5}$ to 3 in beak. Eye $1 \frac{1}{2}$ to 2 in postocular. Maxillary about long as eye, little shorter in young. Hind supraorbital ridge serrate, also short horizontal ridge behind eye and one back side of

occiput. Bony interorbital narrow concave ridge about $2\frac{1}{2}$ to 3 in eye. Gill-opening forward to hind pupil edge. Skin smooth, except in young minute asperities scattered on trunk behind dorsal and anal. Young also with rudimentary short bony keeled plates along lateral line between dorsal and anal, better developed but without spines, in larger examples. Dorsal inserted near last fourth between front eye edge and caudal base, slightly posterior in young; fin equals post-orbital to same with $\frac{1}{4}$ of eye. Anal opposite and like dorsal. Caudal lobes about $\frac{3}{4}$ of dorsal. Caudal filaments long, or even longer than beak. Ventral $1\frac{1}{2}$ to 2 in eye.

Color in alcohol: uniform brown above, much paler below. Iris whitish. Fins all brownish-white. Length 204 to 413 mm. to caudal tips. Oahu, Pomotou Islands and Fiji, three examples. Also 5 in the Academy. Hawaiian and Philippine. The last is represented by an example identified by Fowler as F. serrata Cuvier.⁴⁸

From F. depressa Gunther⁴⁹ this species has been distinguished by the more serrate lower lateral ridges of the snout, certainly a slight character. F. corneta Gilbert and Starks⁵⁰ is another species which differs but slightly, apparently in the smaller eye and broader interorbital. Jordan and Starks

48 Copeia, June 18, 1918, No. 58, p. 62.

49 Rep. Voy. Challenger, vol. I, 1880, p. 69, Pl. 32, fig. 1.

50 Mem. Cal. Acad. Sci., vol. 4, 1904, p. 56, Pl. 10, figs. 18-18a. Panama and Mazatlan.

distinguish F. depressa Gunther by the two median ridges on the snout well separated, diverging on the front part of the snout and converging finally on its foremost part.⁵¹ Also

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the distance between them is always much less than the distance from them to the upper lateral ridge of snout. The skin of F. depressa is said to be nearly smooth while that of F. petimba is rough. While our material is represented by much smaller specimens these characters do not hold entirely. Weber and Beaufort have shown that

51 Proc. U. S. Nat. Mus., vol. 26, 1903, p. 66.

F. petimba is a smooth, naked species. white F. villosa Klunzinger is rough with spinulets and has a single median row of narrow beeked scales on both dorsal and ventral body edges.

~~Synaptobranchius~~

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OPHICEPHALIDAE

Ophicephalus striatus Bloch

Head 3; depth $6\frac{1}{4}$; D. 41; A. 25; scales 50 in lateral line to caudal base and 5 more on latter; 5 scales above lateral line to dorsal origin; 8 below to anal origin; 11 predorsal scales to occiput; snout 5 in head from upper jaw tip, eye $7\frac{3}{4}$; maxillary $2\frac{1}{4}$; interorbital 4. Snout length $\frac{3}{4}$ its width. Interorbital depressed, nearly level. Rakers ~~iii~~ xi, short low asperous tubercles, rather uneven, largest barely $\frac{2}{3}$ of filaments, which 2 in eye. Ten scales between eye and preopercle angle; scales with 30 basal radiating striae; apical carinae 24 to 27. In alcohol brown, clouded darker. Belly and lower surface of head soiled whitish. Dorsal with 4 longitudinal dark brown lines.

Caudal uniform dusky-brown. Anal mottled with dusky-brown spots, outer portion of fin darker. Length 270 mm. Manila.

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Atherinidae.

Hepsetia pinguis (Lacepede).

Head $3 \frac{7}{8}$ to 4; depth $4 \frac{5}{6}$ to 5; D. VI, ii, 9; A. ii, 12; scales 40 to 42 in median lateral series from shoulder to caudal base and 5 or 6 more on latter; 7 scales transversely at soft dorsal origin; 17 or 18 predorsal scales to head; snout $3 \frac{2}{5}$ to 4 in head; eye $2 \frac{1}{2}$ to $2 \frac{2}{3}$; maxillary $2 \frac{1}{3}$ to $2 \frac{2}{5}$; interorbital $2 \frac{5}{2}$ to 3.

Body well compressed, deepest at ventral origin; caudal peduncle moderately deep, least depth $1 \frac{3}{5}$ to $1 \frac{4}{5}$ its

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length or 3 to $3 \frac{1}{8}$ in head. Head width $1 \frac{5}{6}$ in its length. Snout obtuse, much shorter than eye, length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Eye large, impinging on upper profile, and hind pupil edge about midway in head length. Mouth moderate, oblique, jaws even. Maxillary partly concealed by narrow preorbital, reaches beyond front eye edge though not quite to pupil. Teeth very fine, in narrow bands in jaws, along maxillary edge and across vomer. Muzzle quite cavernous. Interorbital level. Gill-rakers 7 - 23, lanceolate, about $\frac{1}{3}$ longer than filaments or $2 \frac{1}{6}$ in eye. Scales narrowly imbricated, exposed edges mostly entire, with 3 or 4 basal points and about 43 to 48 parallel basal circuli. Spinous dorsal inserted midway between hind pupil or eye edge and caudal base, first spine $2 \frac{2}{5}$ or $2 \frac{7}{8}$ in head. Soft dorsal inserted at first $\frac{2}{5}$ in space between spinous dorsal and caudal base, 2 to $2 \frac{1}{6}$ in head. Anal inserted well before soft dorsal origin, first branched ray about 2 in head. Caudal (damaged) forked. Pectoral $1 \frac{1}{6}$ to $1 \frac{1}{4}$ in head; ventral 2.

Color in alcohol: dull brownish generally, scales on back all finely dotted with dusky. Sides of head and iris with silvery reflections. Minute dusky dots on muzzle and head above. From shoulder broad silvery-white band, about wide as pupil, to caudal base medially. Pectoral with dusky blotch little less than eye on outer half. Fins otherwise pale. Length 105 to 107 mm. Two from Sydney.

The vent in our examples falls a little further back than Ogilby shows,⁵⁸ though at least before tips of depressed ventrals.

⁵⁸ Mem. Queensland Mus., 1912, p. 40, fig. a.

Hepsetia insularum (Jordan and Evermann).

Head $3 \frac{2}{3}$ to 4; depth $4 \frac{3}{4}$ to 5; D. IV or VI - II, 10, 1; A. II, 15 or 16, 1; scales 45 or 46 in median lateral series from shoulder to caudal base and 5 or 6 more on latter; 6 or 7 scales transversely at soft dorsal origin; 17 to 19 predorsal scales to head; snout $3 \frac{1}{2}$ to $3 \frac{3}{4}$ in head; eye $2 \frac{1}{2}$ to $2 \frac{3}{4}$; maxillary $2 \frac{1}{5}$ to $2 \frac{1}{4}$; interorbital $2 \frac{2}{5}$ to 3.

Body compressed, deepest at ventral origin; caudal peduncle slender, compressed, least depth $1 \frac{1}{4}$ to 2 in its length or $2 \frac{3}{4}$ to $3 \frac{1}{4}$ in head. Head width $1 \frac{9}{10}$ to 2 in its length. Snout obtuse, shorter than eye, length about $\frac{2}{3}$ to $\frac{3}{4}$ its width. Eye large, impinging on upper profile, hind pupil edge about midway in head length. Mouth moderate, jaws even. Maxillary partly concealed by narrow preorbital, reaches beyond front eye edge, though not quite to pupil. Teeth minute, in narrow bands in jaws. Muzzle cavernous. Interorbital level. Gill-rakers 7 - 23, lanceolate, slender, slightly longer than filaments or about 2 in eye. Scales narrowly imbricated, exposed edges mostly entire, with 1 to 3 basal points and about 12 to 30 basal parallel circuli. Spinous dorsal inserted about midway between eye center and caudal base, little more forward in young; first spine $2 \frac{1}{5}$ to $2 \frac{1}{4}$ in head. Soft dorsal origin at first third or $\frac{2}{5}$ between spinous dorsal origin and caudal base; first branched ray 2 to $2 \frac{1}{5}$ in head. Anal inserted well before soft dorsal origin or about midway between lowest pectoral ray base and caudal base or midway between pectoral origin and caudal base in young; first branched ray $1 \frac{7}{8}$ to $2 \frac{1}{8}$ in head.

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Caudal well forked, about $1 \frac{1}{5}$ to $1 \frac{2}{5}$ in head; pectoral $1 \frac{1}{5}$ to $1 \frac{1}{3}$; ventral $1 \frac{5}{8}$ to $1 \frac{7}{8}$.

Color in alcohol: brownish above, paler below. Each scale on back with narrow area of dusky dots or specks submarginally, but well back from scale edge. Side of head and iris silvery-white, dark dots on muzzle and ^a few on under surface. ^a Broad silvery-white band extends from shoulder to caudal base medially, little less than eye-diameter in width. Fins all plain, pale. Length 53 to 87 mm. Three from Maui.

Besides the above we, also, include an example in the Academy from Honolulu. This species is allied with H. pinguis (Lacepede) and H. lacunosa (Schneider) in its gill-rakers, but differs in its uniform pale pectorals.

Chirostoma mauleanum Steindachner.

Head $4 \frac{3}{5}$; depth $6 \frac{1}{4}$?; D. VI, ii, 7; A. ii, 12; P. i, 13; V. i, 5; scales (pockets) 77 in median lateral series from shoulder to caudal base; 12? scales transversely at soft dorsal origin; snout $3 \frac{1}{8}$ in head; eye 4; maxillary $4 \frac{1}{3}$; interorbital $3 \frac{1}{2}$.

Body ~~apparently compressed~~ ^{compressed} moderately, at least behind; caudal peduncle with least depth about 3 in its length or $3 \frac{1}{8}$ in head. Head width $2 \frac{2}{5}$ its length. Snout rather obtuse, about long as wide. Eye moderate, hind pupil edge slightly in advance of center in head length. Mouth small,

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with short curved gape, jaws even in front. Maxillary largely concealed above, about $3/5$ in snout. Teeth fine in narrow bands in jaws. Interorbital (damaged) apparently nearly level. Gill-rakers 7 - 21, lanceolate, about long as filaments or $1 \frac{1}{5}$ in eye. Scales caducous, small, narrowly imbricated, exposed surfaces entire and 18 or 19 parallel mostly vertical basal circuli. Spinous dorsal inserted about midway between snout tip and caudal base. Soft dorsal inserted slightly nearer ventral origin than caudal base. Anal more advanced, or its insertion little nearer caudal than pectoral base. Pectoral (damaged) reaches little over half way to ventral, and latter inserted about midway between snout tip and middle in caudal peduncle length, fin 2 to anal.

Color in alcohol: faded brown, largely uniform. Sides of head and eye with silvery tints. Broad silvery-white lateral band, widens little broader than eye between dorsal and anal and extends to caudal base. Length 83 mm. (caudal damaged). Valparaiso.

C. itatana Steindachner, also from Chile, is described with 87 to 90 scales on examples 22 cm. long.⁵⁹

59 Ann. Hofmus. Wien, vol. 11, 1896, p. 23.

Thyrina brasiliensis (Valenciennes).

Head 4 $\frac{1}{8}$; depth 4 $\frac{2}{3}$; D. III-ii, 7; A. ii, 19; P. i, 13; V. i, 5; scales 39 in median lateral series from shoulder to caudal base and 5 more on latter; 9 scales transversely at soft dorsal origin; 20 predorsal scales to head; snout 3 in head; eye $3\frac{1}{2}$; maxillary 3; interorbital 3.

Body well compressed, flattened sides of trunk constricted below; abdominal edge well convex; caudal peduncle well compressed, least depth $1\frac{2}{3}$ its length or $2\frac{1}{4}$ in head. Head width $1\frac{4}{5}$ its length. Snout broadly depressed, length $\frac{4}{5}$ its width. Eye high, with hind pupil edge about midway in head length. Mouth with short curved gape, upper jaw slightly longer. Maxillary largely concealed above, reaches beyond eye front though not quite to pupil. Narrow band of rather small curved conic teeth in jaws and each with outer row of few irregular larger similar ones, best developed near front above and on sides below. No vomerine or palatine teeth. Interorbital wide, very slightly convex. Gill-rakers 5 - 13, lanceolate, firm, long as filaments or 2 in eye. Scales firmly adherent, narrowly exposed, mostly uniform, with 1 or 2 basal points; about 50 basal circuli parallel with edge; apical portions and edges entire. Lateral line extends close over pectoral for 7 scales, then drops 1 scale and continues midway along side to caudal base medially; tubes small and simple, only about one half of scale exposed. Spinous dorsal inserted about midway between pectoral origin and caudal base, spines thin, fin scarcely $\frac{1}{3}$ to soft dorsal. Origin of last nearer caudal base than depressed ventral tips.

Anal inserted opposite spinous dorsal origin, fin base extends back slightly beyond second dorsal base. Caudal (damaged)? Pectoral $1 \frac{1}{8}$ in head; ventral $2 \frac{1}{6}$.

Color in alcohol: olive-brownish, little paler below. Fins all brown. Iris silvery. Narrow brassy lateral band, less than eye in greatest width above anal, contains first part of lateral line and then continues throughout same row of scales above rest of l. l. to caudal base medially. Length 103 mm. (caudal damaged). Rio Janeiro.

A colored sketch by J. Drayton from an example 116 mm. long is likely the same as the above described. It is labeled Rio Janeiro, December 1838. Its back is shown as olive with a narrow green lateral streak with a lower one below, both parallel and adjoining to caudal base. Lower half of head and body white, with iridescent tints. Soft dorsal and anal pale buff - dull reddish at outer part of front lobes. Caudal ventral, tinted reddish marginally. Pectoral and iris whitish. This sketch does not show any spinous dorsal or ventral fins.

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Jordan and Hubbs state⁶⁰ that "the type locality of Ischnomembras gabunensis is very probably incorrect," which may, or may not, be true. Notwithstanding that genus may be identical with Menidia, as they claim, we feel that ^{it} is not impossible that the two types were actually secured in the French Congo. We have examined scales from the type of I. gabunensis and find the basal striae 6 to 8, circuli above and below 14 to 16 and apical circuli 32 to 35. A series of Menidia notata show 7 to 11 basal striae, usually about 7 to 9. We have also examined the type of Phoxargyrea dayi Fowler in this connection and find it has 9 or 10 basal striae and the circuli 17 above and same below, also irregularly fine apically or about 44. In M. notata of similar size the scales were usually much more imbricated or narrower. It is thus evident that the scales show very slight characters.

60 Stanford Univ. Pub. (Stud. Ich.) 1919, p. 51.

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Basilichthys affinis (Steindachner).

Head 4 to $4 \frac{1}{5}$; depth 5 to $5 \frac{1}{2}$?; D. VI ii, 8 or 9; A. ii, 13 or 14; scales 88 to 95 in median lateral series from shoulder to caudal base and 8 to 10 more on latter; 15 scales transversely at soft dorsal origin; 44 to 46 predorsal scales; snout $2 \frac{7}{8}$ to 3 in head; eye $5 \frac{1}{2}$ to $5 \frac{7}{8}$; maxillary 3 to $3 \frac{1}{8}$; interorbital $3 \frac{1}{3}$.

Body compressed, deepest at depressed pectoral tip; caudal peduncle compressed, least depth $2 \frac{1}{2}$ to 3 in its length or $3 \frac{2}{5}$ to 4 in head. Head width 2 to $2 \frac{1}{2}$ in its length. Snout conic, much longer than eye, width $1 \frac{1}{5}$ its length. Eye elevated, hind edge midway in head length. Mouth small, gape about half way in snout, slightly curved or bent. Jaws well protractile forward, even in front when closed. Maxillary oblique, upper half concealed, not quite to eye. Teeth moderately small, simple, conic, 2 rows above and below, though inner lower ones smaller. Mandibular rami well elevated inside of mouth. Interorbital broad, slightly convex. Gill-rakers 9 - 26, lanceolate, about $\frac{1}{2}$ of filaments and latter equal eye. Scales firmly adherent, rather narrowly imbricated, exposed surfaces entire and 16 to 40 parallel mostly vertical basal circuli. Cheeks 9 or 10 to lower preopercle corner. Spinous dorsal inserted about midway between front eye edge and caudal base, or midway between hind eye edge and caudal base in smaller example; fin $3 \frac{1}{2}$ to $3 \frac{3}{5}$ in head. Soft dorsal inserted about midway between ventral origin and caudal base; first branched ray about $2 \frac{3}{4}$ to 3 in head. Anal inserted little nearer caudal than pectoral base;

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first branched ray $2 \frac{3}{5}$ to $2 \frac{4}{5}$ in head. Caudal (damaged) emarginate. Pectoral $1 \frac{3}{5}$ in head; ventral $2 \frac{7}{8}$ to 3.

Color in alcohol: dull brown generally. Opercle, eye and broad band, from shoulder to caudal base medially, brass-color; latter increasing in width until wide as eye below second dorsal. Fins all dull brown. Length 183 to 213 mm. Callao. Two examples.

Mugilidae.

Mugil cephalus Linnaeus.

Two from Lima, and one from each of the following, Peru, Callao and Valparaiso. Length 175 to 230 mm. Except the Valparaiso example, which has A. III, 9, all the others have A. III, 8, and appear to agree in most details. The Valparaiso example has 30 to 58 gill-rakers and the scales with 11 or 12 basal marginal radii. Italian examples in the Academy 185 mm. long have the gill-rakers about 33 - 46 and the scales with 8 to 10 basal radii. The smaller examples are all without much, or little, trace of the adipose eyelid.

One from Maui in the Querimana stage, shows: Head $3 \frac{1}{5}$; depth 4; D. IV-I, i, 8; A. II, 9; scales about 42 from shoulder to caudal base; 14 scales transversely at soft dorsal origin; 17 predorsal scales to head; snout 4 in head; eye $3 \frac{1}{8}$; maxillary $3 \frac{3}{4}$; interorbital 3; length 54 mm. It shows gill-rakers 17 - 32 and scales with 8 or 9 basal marginal striae and 8 to 10 circuli apically. Compared with a similar example in the Academy 39 mm. long from Honolulu, the gill-rakers are 10 - 20 and about $\frac{3}{4}$ long as gill-filaments. Its scales with 6 to 8 basal marginal striae and 8 to 21 apical circuli. In proportions, etc., the Honolulu example agrees in most every respect. Another small example in the Academy from Waiahua, or Oahu, has a narrow adipose eyelid. This may be M. cephalotus Eydoux and Souleyet,⁶¹ and though it agrees fairly well with the original figure, it is too small for

satisfactory comparison.

All the above material agrees in the character of the rather long spinous dorsal, when compared with the Italian material. In the last when the spinous dorsal is depressed we count 5 to 7 scales behind it to the soft dorsal, whereas all the South American material shows but 4 and rarely 5, and the interspace is noticeably less.

An example in the Wilkes Collection from Hulls Island is like the Italian material in this respect. It has 8 branched anal rays.

Two examples in the Wilkes Collection, 17 to 20 mm., from Fiji, show: Head $3 \frac{1}{5}$ to $3 \frac{1}{3}$; depth $3 \frac{2}{5}$ to $3 \frac{4}{5}$; D. IV-I, 1, 7; A. III, 8 or 11 8; scales 41 in lateral series, 14 transversely and 17 to 20 predorsal.

61 Voy. Bonite, Zool., I, 1842, p. 175, Pl. 4, fig. 4. Des iles Sandwich.

Mugil trichilus Vaillant and Sauvage.

Head $3 \frac{1}{4}$ to $3 \frac{3}{4}$; depth $3 \frac{3}{5}$ to $4 \frac{1}{5}$; D. IV-I, 1, 7; A. III, 1, 8; scales 32 to 35 from shoulder to caudal base and 5 or 6 more on latter; 11 scales transversely at soft dorsal origin, rarely 10; 13 to 16 predorsal scales to head; snout $3 \frac{2}{3}$ to $3 \frac{3}{4}$ in head; eye 4 to $4 \frac{1}{8}$; maxillary $3 \frac{1}{2}$ to $3 \frac{3}{4}$; interorbital $2 \frac{1}{3}$ to $2 \frac{2}{3}$. Body compressed, deepest at dorsal origin; caudal well compressed, least depth $1 \frac{1}{4}$ to $1 \frac{1}{3}$ in its length or $2 \frac{1}{3}$ to $2 \frac{1}{2}$ in head. Head width $1 \frac{1}{2}$

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to $1\frac{3}{4}$ its length. Snout broad, rather obtuse, length $\frac{1}{2}$ to $\frac{3}{5}$ its width. Eye large, with moderate adipose-lid in front and behind, and hind eye edge about midway in head; adipose-lid scarcely or not developed in young. Upper jaw moderately protruded beyond lower; mouth as viewed below, would form an obtuse angle. Maxillary concealed; exposed in young. Lower preorbital edge finely serrate. Teeth not evident. Interorbital broadly convex. Gill-rakers 37 - 65, 32 - 44 in young, fine, $1\frac{3}{4}$ in filaments, last equal eye. Scales adherent, with 5 to 10 marginal basal striae. space between rictal and median branchiostegal groove scaled. Soft dorsal and anal with rather numerous scales over basal portions of fins. Spinous dorsal inserted slightly nearer caudal base than snout tip, about midway between caudal base and eye center in young, depressed fin $1\frac{1}{5}$ to $1\frac{3}{5}$ to soft dorsal or with 3 to 5 scales behind. Soft dorsal inserted about midway between spinous dorsal and caudal base, first branched ray 2 to $2\frac{1}{8}$ in head. Anal inserted little before soft dorsal origin, first branched ray $1\frac{9}{10}$ to $2\frac{1}{10}$ in head. Caudal deeply emarginate. Pectoral reaches opposite or nearly so to spinous dorsal origin, $1\frac{1}{8}$ to $1\frac{1}{4}$ in head; ventral $1\frac{1}{2}$ to $1\frac{3}{5}$.

Color in alcohol: dull olivaceous-brown, nearly uniform, paler below. Length 90 to 145 mm. Tongatabu, Fiji, Tahiti. Five examples.

Mugil trichilus Vaillant and Sauvage⁶² is omitted by Jordan and Evermann in their account of Hawaiian Fishes. It is described with dark fins though otherwise in agreement

with this species. Possibly the fins may to more or less extent be darkened by preservation, as they appear so in

62 Rev. Mag. Zool., 1875, p. 281, Hawaii.

some of our smaller specimens. M. kandavensis Gunther⁶³ is a synonym.

Besides the Wilkes material are several examples in the Academy. The first of these comprise two examples wrongly referred to M. kelaarti Gunther, by Fowler.⁶⁴ They differ from the Indian Ocean M. kelaarti in the distinctly longer upper jaw and moderately developed adipose eyelid. A conspicuous character in harmony, however, is the long pectoral fin which reaches to or nearly opposite the spinous dorsal origin. M. caldwelli Fowler⁶⁵ is also a synonym. on account of its little developed eyelid it was later placed in Liza.⁶⁶ The type has the lower jaw slightly more advanced in front than any of our other examples. Gunther has recorded M. kelaarti from Tahiti and Seale from Raiatea.

63 Jour. Mus. Godeffroy, vol. 11, 1876, p. 215. Kandavu.

64 Proc. Acad. Nat. Sci. Phila., 1900, p. 500,.

65 L. c., p. 524, Pl. 19, fig. 4, Samoa.

66 L. c., 1903, p. 747.

Mugil lepidopterus Fowler.

Head $4 \frac{1}{5}$; depth $3 \frac{3}{5}$; D. IV+ I, 1, 7; A. III, 1, 8; scales 30 from shoulder to caudal base; 11 scales transversely at soft dorsal origin; 14 predorsal scales to head; snout $3 \frac{2}{3}$ in head; eye 4; mouth width $3 \frac{1}{5}$; interorbital

$2 \frac{2}{5}$; gill-rakers about 45 - 55; scales with about 5 to 9 basal striae (about 5 to 7 in type); depressed spinous dorsal $1 \frac{3}{5}$ to soft dorsal; length 233 mm. One from Manila.

Mugil curema Valenciennes.

Head $3 \frac{5}{6}$; depth $3 \frac{5}{6}$; D. IV- I, 8; A. III, 9; scales 40 from shoulder to caudal base; 13 scales transversely at soft dorsal origin; 14 predorsal scales to head; snout $3 \frac{2}{5}$ in head; eye $3 \frac{2}{5}$; mouth width $3 \frac{2}{3}$; interorbital $2 \frac{1}{4}$; scales with 10 to 12 basal striae; length 170 mm. One from Rio Janeiro.

Myxus elongatus Gunther.

Head $3 \frac{7}{8}$; depth $4 \frac{1}{8}$; D. IV-I, 8; A. III, 9; scales 44 to caudal base; 15 scales transversely at soft dorsal origin; 18 predorsal scales to head; snout $3 \frac{2}{5}$ in head; eye $4 \frac{1}{2}$; maxillary $3 \frac{7}{8}$; interorbital $2 \frac{2}{3}$.

Body well compressed, caudal peduncle likewise, least depth half its length or $2 \frac{1}{3}$ in head. Head width $1 \frac{2}{3}$ its length. Snout length about $\frac{2}{3}$ its width. Eye with hind edge about midway in head. Maxillary $\frac{4}{5}$ to eye, exposed. Mouth oblique; even jaws with rather trenchant edges. Upper teeth uniserial, small, firm, close-set, simple; lower teeth row of fine short simple cilia; transversely across vomer

narrow band in about 1 to 3 irregular rows of small conic simple teeth. Interorbital broadly convex. Preorbital with lower and hind edges finely and evenly denticulate. Gill-rakers about 30 to 50, finely lanceolate, about equal filaments with eye. Scales adherent; basal radiating striae 11 to 14; circuli fine; 6 scales on cheek to preopercle corner; soft dorsal and anal scaled. Spinous dorsal origin about midway between front eye edge and caudal base, first and second spines subequally longest or about 2 in head. Soft dorsal origin about midway between first dorsal origin and caudal base, fin $1\frac{3}{4}$ to latter. Anal inserted well before soft dorsal origin or about midway between ventral and caudal base. Caudal deeply emarginate, nearly long as head. Pectoral $1\frac{1}{2}$ in head; ventral $1\frac{7}{8}$.

Color in alcohol, brassy-olive generally, paler below. Fins brownish, Length 221 mm. Sydney.

Neomyxus chaptali (Eydoux and Souleyet).

Head $3\frac{4}{5}$ to 4; depth 4 to $4\frac{1}{5}$; D. IV- I, 9; A. III, 10; scales 45 to 48 from shoulder to caudal base; 14 scales transversely at soft dorsal origin; 17 to 20 predorsal scales to head; snout 3 in head; eye 4 to $4\frac{1}{5}$; maxillary $3\frac{1}{4}$ to $3\frac{2}{3}$; interorbital 2 to $2\frac{1}{4}$.

Body well compressed, caudal peduncle likewise, least depth $1\frac{1}{2}$ to $1\frac{3}{4}$ in its length or $2\frac{1}{10}$ to $2\frac{1}{4}$ in head. Head width $1\frac{1}{2}$ to $1\frac{3}{5}$ in its length. Snout broadly conic, length

about $2/3$ to $7/8$ its width. Eye with hind edge slightly behind center in head length; hind pupil edge midway in smaller example. Maxillary $7/8$ to eye, slightly shorter in young, concealed. Jaw edges rather broad; fleshy lips wide, especially upper. Teeth fine, uniserial, long, slender, ends curved and tridentate, close-set in jaws; no teeth on mouth roof. Interorbital broadly convex. Preorbital with lower portion of lower edge and all of hind edge denticulate. Gill-rakers 47 - 56, finely lanceolate, 2 in filaments, which equal eye. Scales firmly adherent; 12 to 14 marginal basal striae, 10 in younger; circuli very fine; 5 or 6 rows of scales on cheek to preopercle angle; soft dorsal, caudal and anal with fine close-set scales over basal portions of fins. Spinous dorsal origin little nearer caudal base than snout tip, first spine longest or 2 in head. Soft dorsal origin about midway between first dorsal origin and caudal base, depressed fin $1\frac{2}{3}$ to $1\frac{3}{4}$ to caudal base. Anal inserted well before soft dorsal, or slightly nearer caudal base than ventral origin, about midway in young; fin $1\frac{3}{4}$ to $1\frac{4}{5}$ to caudal base. Caudal deeply emarginate, Pectoral $1\frac{1}{4}$ to $1\frac{1}{3}$ in head; ventral $1\frac{2}{3}$ to $1\frac{3}{4}$.

Color in alcohol, brassy-brown generally, paler below. Fins brownish. Length 185 to 263 mm. Wakes Island.

We also include two Hawaiian examples in the Academy.

Agonostomus forsteri (Schneider).

Head $3 \frac{3}{5}$ to $3 \frac{3}{4}$; depth $4 \frac{3}{5}$ to 5; D. IV- I, 1, 8; A. III, 13; scales 60 to 64 from shoulder to caudal base and 7 more on latter; 15 scales transversely to anal; 23 or 24 predorsal scales to head; snout $3 \frac{2}{5}$ to $3 \frac{3}{4}$ in head from upper jaw tip; eye $4 \frac{1}{2}$ to $4 \frac{7}{8}$; maxillary $3 \frac{2}{5}$ to $3 \frac{1}{2}$; interorbital $3 \frac{1}{5}$ to $3 \frac{2}{5}$.

Body long, fusiform, well compressed; least depth of caudal peduncle $1 \frac{3}{4}$ to 2 in its length or 3 to $3 \frac{1}{8}$ in head. Head width $1 \frac{3}{4}$ to 2 in its length. Snout rather conic, length $\frac{4}{5}$ to $\frac{7}{8}$ its width. Eye with hind edge slightly advanced from middle of head, about midway in young. Maxillary to eye, concealed. Lower jaw slightly protrudes, edge trenchant. Narrow band of minute or fine teeth in each jaw, also across vomer and on each palatin. Front of tongue with many similar fine teeth. Lower and hind preorbital edge finely denticulate. Interorbital broadly convex. Gill-rakers 22 - 35, fine lanceolate, long as filaments or nearly equal eye. Scales adherent; basal radiating striae 8 to 11; circuli moderately numerous; 6 or 7 scales on cheek to preopercle corner; soft dorsal, anal and caudal covered with fine scales basally. First dorsal origin about midway between front nostril and caudal base, or about midway between snout tip and caudal base in young; first spine $1 \frac{7}{8}$ to 2 in head. Soft dorsal inserted slightly nearer caudal base than spinous dorsal origin. Anal inserted about opposite end of depressed spinous dorsal tip, or little nearer ventral origin than caudal base. Caudal about $1 \frac{1}{5}$ to $1 \frac{1}{3}$ in head; pectoral

1 1/3; ventral 1 7/8 to 2.

Color in alcohol, dull brownish with brassy reflections, sides and below paler. Fins brownish, dark in young evidently due to discolor in preservation. Length 125 to 205 mm. The smaller labeled New Zealand and the larger "Maui", the latter doubtless an error and the specimen probably also from New Zealand.

SPHYRAENIDAE.

Sphyraena langsar Bleeker.

Head $2\frac{4}{5}$ to $3\frac{1}{6}$; depth $5\frac{2}{3}$ to 8; D. V - I, 9; A. II, 9; scales 75 to 84 in lateral line to caudal base and 8 to 14 more on latter; 8 or 9 scales above lateral line to soft dorsal origin; 9 or 10 scales below lateral line to anal origin; 28 to 32 predorsal scales to head; snout $2\frac{1}{5}$ to $2\frac{1}{4}$ in head from upper jaw tip; eye $4\frac{1}{4}$ to $5\frac{1}{8}$; maxillary $2\frac{2}{5}$ to $2\frac{2}{3}$; interorbital $5\frac{1}{8}$ to $6\frac{3}{4}$.

Body moderately elongate; fusiform, compressed; least depth of caudal peduncle 2 to $2\frac{4}{5}$ in its length or $4\frac{1}{5}$ to $4\frac{1}{4}$ in head. Head well compressed, width $3\frac{1}{8}$ to $3\frac{4}{5}$ in its length. Snout conic, width 2 to $2\frac{1}{4}$ in its length. Front pupil edge about midway in head. Maxillary $\frac{4}{5}$ to $\frac{9}{10}$ in snout and a row of fine even teeth along its edge. Upper canines 4 in front, one below in front directed back. Interorbital nearly level. Gill-rakers lanceolate, 2, one in angle of first arch and other close below. Scales rather adherent, parallel; basal marginal striae 28 to 50; circuli very fine; 7 or 8 scales behind eye to preopercle ridge; soft dorsal and anal scaly basally. First dorsal origin much nearer mandible tip than caudal base, second spine $2\frac{1}{3}$ to 3 in head; origin slightly more backward in young. Soft dorsal inserted much nearer origin of first dorsal than caudal base; first ray $2\frac{3}{4}$ to 3 in head. Anal opposite second dorsal, similar. Caudal well forked, $1\frac{5}{6}$ to $2\frac{1}{5}$ in head; pectoral $2\frac{3}{4}$ to $3\frac{1}{8}$, nearly or quite to first dorsal; ventral 3 to $3\frac{1}{8}$. In alcohol back brownish, sides and below paler, with silvery-white tints. Iris pale. Length 120 to 200 mm. Two from Manila and one from Fiji. Also outline drawing of one from Manila and one from Fiji.

We also include 2 Philippine examples in the Academy. Upon comparison with S. commersoni Valenciennes from Hawaii and Tahiti, with which

S. snodgrassi Jenkins also from Hawaii is synonymous, we find S. commersoni has much smaller postocular scales, or about 16. It also has but 8 anal rays and 1 or 2 more scales above the lateral line.

Sphyraena tome Fowler.

Head $2-9/10$; depth $7-3/4$; D. V - ii, 8; A. II, 8; scales 130 in lateral line to caudal base and 7 more on latter; 16 scales above lateral line to spinous dorsal origin, 12 above to soft dorsal origin and 12 below to spinous anal origin; 50 predorsal scales to occiput; snout $2-1/4$ in head from upper jaw tip; eye $5-1/8$; maxillary $2-3/5$; interorbital $5-4/5$; head width $3-5/6$ in its total length. Snout conic, width $2-1/6$ its length. Eye large, front pupil edge midway in head length; $2-3/5$ in snout. Maxillary reaches $5/6$ to eye; expansion 2 in eye. Dentition as in type. Interorbital slightly elevated, largely depressed medianly. scales with 45 to 55 basal radiating striae, many incomplete and variable; about 35 in type. Although pectoral damaged, apparently reaches over $3/4$ to spinous dorsal. Color in alcohol uniform dull brown, but little paler below. Length 245 mm. Rio Janeiro. *Also outline drawing.*

Compared with the type, now in the Academy, S. branneri Ribeiro appears to differ chiefly in the presence of 2 more spines in the first dorsal. Its scales are given as 114 in the lateral line.

Sphyraena japonica Valenciennes.
Sphyraena helleri Jenkins.

Head $2-7/8$ to $2-9/10$; depth 8 to 9; D. V - I, 9; A. II, 8 or 9; scales 135 to 150 in lateral line to caudal base and 13 to 15 more on latter; 15 scales above lateral line to soft dorsal origin; 15 or 16 scales below lateral line to anal origin; 62 to 65 predorsal scales to head; snout $2-1/10$

to $2\frac{1}{5}$ in head from upper jaw tip; eye $5\frac{1}{6}$ to $5\frac{4}{5}$; maxillary $2\frac{1}{2}$ to $2\frac{5}{6}$; interorbital 6 to $6\frac{1}{6}$.

Body compressed; least depth of caudal peduncle $2\frac{2}{3}$ to $3\frac{1}{4}$ its total length or $5\frac{1}{2}$ to 7 in head. Head width 4 to $4\frac{1}{5}$ its length. Snout conic, width $2\frac{2}{5}$ to 3 in its length. Eye with front edge about midway in head length, slightly advanced, in younger example. Maxillary $\frac{3}{4}$ to $\frac{4}{5}$ to eye, with row of fine even teeth along its edge. Four large canines at front of upper jaw and one at front of lower directed back. Interorbital level, scarcely convex. Gill-raker short lanceolate point in angle of arch. Scales caducous, with very numerous fine even radiating striae all around and also equally fine circuli; 15 scales behind eye to preopercle ridge; soft dorsal and anal finely scaled basally. Spinous dorsal origin slightly nearer mandible tip than caudal base, third spine $3\frac{1}{3}$ to $3\frac{7}{8}$ in head. Soft dorsal origin nearer caudal base than first dorsal origin, about midway in younger example; first branched ray 3 to $4\frac{4}{5}$ in head. Anal opposite soft dorsal, similar. Caudal well forked, $1\frac{5}{6}$ to $2\frac{2}{5}$ in head; pectoral $3\frac{1}{8}$ to 4; ventral $3\frac{1}{3}$ to 4. In alcohol back brownish, sides and below whitish with silvery tint. Fins pale brown. Dorsals and caudal slightly dusky towards ends. Length 208 to 278 mm. Two from Maui, one said to be from fresh-water. *Also*

outline drawing

An Hawaiian example in the Academy shows: Head 3; depth $8\frac{1}{8}$; D. V - I, 9; A. II, 8; scales 123 in lateral line to caudal base and 5 more on latter; body and head mostly cylindrical; jaws slender; eye large, lower edge about $\frac{3}{5}$ in head depth; mandible tip fleshy; interorbital flattened; pectoral not reaching first dorsal, length 581 mm.

We have compared this species with S. novae-hollandiae Gunther, represented by 3 examples from Victoria in the Academy, which show: Head $3\frac{2}{5}$;

depth $9\frac{2}{3}$ to 11; D. V - I, 9; A. II, 9; scales 120 to 131 in lateral line to caudal base and 8 to 10 more on latter; 11 or 12 scales transversely above lateral line to soft dorsal origin; 8 or 10 scales below lateral line to anal origin; 40 to 44 predorsal scales to head; snout $2\frac{1}{8}$ to $2\frac{1}{6}$ in head, measured from upper jaw tip; eye $6\frac{1}{3}$ to $6\frac{3}{4}$; maxillary $2\frac{3}{4}$ to $2\frac{4}{5}$; interorbital $6\frac{2}{5}$ to 7; length 397 to 470 mm.

POLYNEMIDAE.

Polydactylus virginicus (Linnaeus).

Head $3\frac{1}{4}$ to $3\frac{2}{3}$; depth 3 to $3\frac{1}{2}$; D. VIII - I, 12, 1; A. III, 13, 1; scales 59 to 68 in lateral line to caudal base and 6 to 8 scales above lateral line to spinous dorsal origin, 7 to 9 to soft dorsal origin, 10 to 13 below to spinous anal origin; 31 to 38 predorsal scales; snout 5 to $5\frac{1}{6}$ in head, 6 in young; eye $4\frac{1}{3}$ to $4\frac{3}{4}$, $3\frac{1}{2}$ in young; maxillary $2\frac{1}{5}$ to $2\frac{1}{4}$, $2\frac{1}{10}$ in young; interorbital $3\frac{2}{3}$ to $4\frac{2}{5}$, $3\frac{1}{2}$ in young.

Body elongately ovoid, strongly compressed; least depth of caudal peduncle $1\frac{7}{8}$ to 2 in its length or $1\frac{5}{6}$ to $2\frac{1}{8}$ in head. Head width $2\frac{1}{10}$ to $2\frac{1}{5}$ its length, $2\frac{3}{4}$ in young. Snout obtuse, convex, length in profile $\frac{3}{4}$ its width, about $\frac{3}{5}$ in young. Eye advanced, hind pupil edge about first third in head, covered by broad adipose-eyelid extending back little beyond middle in head length. Mouth moderate, upper jaw tip about opposite hind nostril, lower jaw included. Maxillary back beyond eye and eye about $\frac{3}{5}$ its diameter; expansion $1\frac{3}{4}$ to $1\frac{7}{8}$ in eye. Bands of minute villiform teeth in jaws, on vomer and palatines. Nostrils together, moderate, closer to eye than snout tip as seen in profile. Interorbital convex. Hind preopercle edge denticulate, denticles larger below or lowest largest; corner a cutaneous round flap; membranous suprascapula with strong short spine.

Rakers ii, 12 + 17, ii, lanceolate, longest $1\frac{1}{2}$ in eye; filaments $\frac{2}{3}$ of rakers. Head scaly; all fins more or less covered with small scales; basal radiating striae 5 to 7; apical denticles 80 to 110; circuli moderate; lateral line arched moderately, concurrent with dorsal profile, spores about midway along caudal peduncle side; simple small tubes well exposed. Third dorsal spine $1\frac{1}{4}$ to $1\frac{1}{2}$ in head; first dorsal ray $1\frac{1}{3}$ to $1\frac{1}{2}$; third anal spine $3\frac{1}{10}$ to $4\frac{1}{4}$; first anal ray $1\frac{1}{2}$ to $1\frac{4}{5}$; caudal deeply forked, slender pointed lobes elongate, upper $1\frac{1}{5}$ to $1\frac{1}{3}$; Pectoral $1\frac{1}{5}$ to $1\frac{1}{4}$; filaments 7, extend beyond depressed pectoral and ventral, but not quite to anal origin; ventral 2.

Color in alcohol dull brown generally, apparently stained. Lower surfaces paler. Fins brownish. Dorsals with dusky brown minute dots in outer surfaces, former slightly darker. Ventral, anal, and caudal brownish, first with smutty appearance. Pectoral largely with dusky-lavender tinge. Filaments whitish. Length 145 to 285 mm. Two from Rio Janeiro. We also have examined three in the Academy from Santo Domingo, and include them above.

Polydactylus sexfilis (Valenciennes).

Head $3\frac{1}{3}$ to $3\frac{1}{2}$; depth 3 to $3\frac{1}{10}$; D.VIII - I, 13, 1; A. III, 11, 1; scales 58 to 64 in lateral line to caudal base;

8 scales above lateral line to spinous dorsal origin; 10 above to soft dorsal origin; 33 predorsal scales; snout $4 \frac{4}{5}$ to $5 \frac{9}{4}$ in head; eye $3 \frac{2}{5}$ to 4; maxillary 2; inter-orbital $3 \frac{1}{4}$.

Body elongately ellipsoid, compressed; least depth of caudal peduncle $1 \frac{3}{4}$ its length or $1 \frac{2}{4}$ to 4 in head. Head width $1 \frac{7}{8}$ to $2 \frac{1}{10}$ in head. Snout obtuse, length in profile about $\frac{2}{5}$ to $\frac{3}{5}$ its width. Eye greatly advanced, hind pupil edge about first third in head length; adipose-eyelid broad, extends little over first half of head. Mouth moderate, inferior, upper jaw tip about opposite hind nostril, lower jaw included. Maxillary extends back well beyond eye or about first $\frac{3}{5}$, or slightly over, in head length; expansion $2 \frac{1}{4}$ to $2 \frac{1}{2}$ in eye. Bands of fine villiform teeth in jaws, on vomer and palatines; no others. Nostrils small, together, about midway in snout length. Interorbital broadly convex. Hind preopercle edge evenly and finely denticulate, lower edge entire; suprascapula entire, spine short.

Rakers ii, 12-16 or 17, i; lanceolate, about $1 \frac{3}{5}$ in eye; filaments $\frac{3}{5}$ of rakers. Head mostly scaly; row of scales in spinous dorsal behind and parallel with each spine, and basal sheath of lanceolate scales; soft dorsal anal and caudal covered with small scales; pectoral basally, front outer portion of ventral also inner edge along spine and front ray, with small scales; basal radiating striae 4 to 7;

apical denticles 58 to 76; circuli moderate; lateral line mostly parallel with dorsal profile, midway along caudal peduncle side, tubes simple and well exposed. Third dorsal spine $1\frac{1}{4}$ to $1\frac{1}{3}$ in head; first anal ray $1\frac{1}{3}$ to $1\frac{2}{5}$; long caudal deeply forked, slender jointed lobes with upper longer or about $1\frac{2}{5}$; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$, filaments 6, about $1\frac{1}{7}$ to $1\frac{1}{6}$; ventral $1\frac{2}{3}$ to $1\frac{4}{5}$. Dull brownish in alcohol, back with olive tint and sides brassy. Fins^{plain} pale brown. Length 170 to 227 mm. Two from Oahu.

We have also examined 4 Hawaiian examples in the Academy wrongly referred to P. pfeifferae by Fowler¹⁷⁸. They show: Head 3 to $3\frac{1}{5}$; depth $3\frac{2}{5}$ to 4; D. VIII - I, 13, i; A. III, 11, i, once 12, i; scales 63 to 65 in lateral line to caudal base and 20 more on latter; 10 scales above lateral line to spinous dorsal origin, 9 or 10 to soft dorsal origin; 35 predorsal scales; snout $4\frac{3}{4}$ to 5 in head; eye $3\frac{2}{5}$ to 4; maxillary 2 to $2\frac{1}{10}$; interorbital 3 to $3\frac{4}{5}$; rakers 13 16; pectoral filaments 6; length 81 to 112 mm.

P. pfeifferae (Bleeker), of which we have examined several Sumatran examples in the Academy, shows much larger scales (48 in lateral line to caudal base), longer pectoral filaments (reaching vent), shorter spinous dorsal, deeper head, etc.

Though Jordan and Evermann give 7 dorsal spines for P. sexfilis¹⁷⁹, all our material shows 8.

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Proc. Acad. Nat. Sci. Phila., 1900, p. 501.

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Bull. U.S. Fish. Com., vol. 23, pt. 1, 1903 (1905), p. 144.

Polydactylus plebejus (Broussonet).

Head $2 \frac{7}{8}$; depth $2 \frac{3}{5}$; D.VIII - I, 13, i; A. III, 12, i; scales in lateral line about 46 (mostly pockets) to caudal base; 6 scales above lateral line to spinous dorsal origin, 6 to soft dorsal origin, 10 below to spinous anal origin; 24 predorsal scales; snout 5 in head; eye $3 \frac{7}{8}$; maxillary $2 \frac{3}{5}$; interorbital 4.

Body rather deeply ellipsoid, compressed; least depth of caudal peduncle $1 \frac{1}{2}$ its length or $2 \frac{1}{3}$ in head. Head width $2 \frac{1}{2}$ its length. Snout obtuse, length in profile about $\frac{3}{5}$ its width. Eye advanced, center slightly before first third in head length, a dipose-eyelid broad, extends back little beyond first half of head. Mouth small, inferior, upper jaw tip about opposite front eye edge, lower jaw included. Maxillary extends back beyond eye or about midway in head; expansion $2 \frac{1}{2}$ in eye. Bands of fine villiform teeth in jaws and on palatines, none on vomer or on tongue. Nostrils together, moderate, close before eye and lateral on snout. Interorbital convex, with slight median depression. Hind preopercle edge evenly serrated, with rounded cutaneous flap below; membranous suprascapula with strong short spine.

Rakers $12 + 16$, lanceolate, $1 \frac{3}{4}$ in eye; filaments $\frac{3}{4}$ of rakers. Head mostly scaly; rows of scales on spinous dorsal behind and parallel with each spine and basal sheath of lanceolate scales; soft dorsal, anal and caudal covered with small

scales; pectoral and ventral with traces (pockets) of small scales basally; basal radiating striae 3; apical denticles 45 to 50; circuli moderate; lateral line rather high, mostly concurrent with dorsa; profile, slopes about midway along caudal peduncle side; small simple tubes well exposed. Third dorsal spine $1 \frac{1}{3}$ in head; first dorsal ray $3 \frac{1}{2}$; caudal (damaged) forked, lobes sharply pointed; pectoral $1 \frac{1}{2}$, filaments, apparently not extending much beyond depressed pectoral tip, or $1 \frac{1}{4}$ in head; ventral 2. In alcohol dull brownish generally, back with traces of olive tint and lower surfaces paler to whitish. Fins all dull brownish. Length 130 mm. (caudal damaged). Manila.

One of the examples included as Polydactylus plebejus among Philippine material in the Academy, by Fowler¹⁸⁰, is undoubtedly P. tetradactylus (Shaw). It shows: Head $3 \frac{1}{4}$; depth $3 \frac{2}{5}$; D. VIII - I, 14, 1; A. III, 15, 1; scales 72 in lateral line to spinous dorsal origin, 13 to soft dorsal origin, 13 below to spinous anal origin; 38 predorsal scales; snout $6 \frac{1}{2}$ in head; eye $4 \frac{4}{5}$; maxillary 2; interorbital $3 \frac{4}{5}$. Body rather slender. Head width $2 \frac{1}{2}$ its length. Snout obtuse, length about $\frac{2}{5}$ its width. Eye with hind edge at first third in head. Maxillary extends about an eye-diameter beyond eye, expansion $1 \frac{1}{2}$ in eye. Mouth moderate, lower jaw tip about opposite front nostril. Teeth fine, in bands in jaws, on vomer and palatines. Interorbital convex. Hind preopercle

edge serrated, cutaneous flap below. Rakers 7 7 iii, lanceolate, $1 \frac{1}{5}$ in eye; filaments $\frac{3}{4}$ of rakers. Scales with 4 to 6 basal radiating striae; apical denticles about 40; circuli rather coarse. Fins all more or less scaly, also head. Third dorsal spine $1 \frac{3}{5}$ in head; first dorsal ray $1 \frac{1}{4}$; third anal spine $1 \frac{3}{5}$; first anal ray $1 \frac{1}{2}$; caudal longer than head, lobes sharply pointed and upper little longer; pectoral $1 \frac{2}{5}$, filaments 4; not quite reaching far back as depressed pectoral tip; ventral 2. In alcohol faded dull brown, paler below. Dorsals and caudal dusted with brownish dots. Length 160 mm.

Galeoides decadactylus (Bloch)

Head 3 to $3 \frac{1}{8}$; depth $3 \frac{1}{5}$ to $3 \frac{2}{5}$; D. VIII - I, 14, i; A. III, 11, i; scales 44 or 45 (pockets) in lateral line to caudal base; about 6 scales above lateral line to soft dorsal origin; 8 below to spinous anal origin; about 25? predorsal (pockets) scales; about 5 to $5 \frac{1}{3}$ in head; eye $3 \frac{1}{2}$ to $3 \frac{4}{5}$; maxillary $2 \frac{1}{3}$ to $2 \frac{2}{5}$; interorbital $3 \frac{1}{3}$ to $3 \frac{2}{3}$.

Bony, fusiform, compressed; least depth of caudal peduncle $1 \frac{3}{5}$ to $1 \frac{7}{8}$ its length or $2 \frac{2}{5}$ to $2 \frac{1}{2}$ in head. Head width 2 to $2 \frac{1}{4}$ its length. Snout obtuse, rather truncate as seen from above, length about $\frac{3}{4}$ its width. Eye large, center little before first third in head; adipose-eyelid

completely covers eye and extends back nearly to preopercle ridge. Jaws inferior on head, lower included and tip of upper about opposite hind nostril. Maxillary slightly beyond hind eye edge; expansion $3\frac{1}{4}$ to $3\frac{1}{3}$ in eye. Bands of fine pointed teeth in jaws and on palatines; no others. Nostrils small, together, near middle in snout profile. Interorbital slightly convex, with median depression. Hind preopercle edge finely and evenly serrate, lower edge entire; suprascapula entire.

Rakers ~~9~~ 16 to 18, lanceolate, $1\frac{4}{5}$ in eye, filaments about $\frac{2}{3}$ of rakers. Head largely covered with scales; second and third spinous dorsal membranes finely scaled, also basal sheath of larger scales; soft dorsal, anal and caudal almost entirely covered with small scales; pectoral base and front outer portion of ventral with small scales; basal radiating striae 3; apical denticles 60 to 64; circuli fine; lateral line mostly parallel with dorsal profile, midway along caudal peduncle side; tubes simple, well exposed. Second and third dorsal spines subequal, third $1\frac{1}{4}$ to $1\frac{2}{5}$ in head; first dorsal ray $1\frac{3}{5}$ to $1\frac{3}{4}$; third anal spine $3\frac{2}{3}$ to 4; first anal ray $1\frac{3}{4}$ to $1\frac{7}{8}$?; deeply forked caudal with long pointed lobes at least long as head; pectoral $1\frac{1}{3}$ to $1\frac{2}{5}$, with 9 filaments, last longest and about long as head; ventral $1\frac{7}{8}$ to 2? In alcohol faded mostly dull brown, lower surfaces paler. Fins all dull brown, hind edges spinous

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dorsal dusky. Scarcely trace of dusky round blotch above and opposite outer portion of depressed pectoral. Length 185 to 203 mm. Cap/e Verde Islands, two examples.

A smaller example in the Academy from Cape Palmas, Liberia, shows: Head $3 \frac{1}{6}$; depth $3 \frac{1}{4}$; D. VIII - I, 14, 1; A. III, ii, i; snout 5 in head; eye $3 \frac{1}{5}$; maxillary $2 \frac{2}{3}$; interorbital $3 \frac{1}{3}$; rakers 9+19. Boulenger gives¹⁸¹ but 2 anal spines, but all our examples show three distinctly, the first, however, very small and therefore easily overlooked.

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Cat. Fresh-Water Fish, Africa, vol. 4, 1916, p. 104.

SCOMBRIDAE.Scomber japonicus Houttuyn.

Figs. 93-94.

Head $3 \frac{1}{8}$ to $3 \frac{1}{5}$; depth $4 \frac{4}{5}$ to 5; D.X-II, 11 + 5, or 6; A. I, 1, 10 + 5; snout 3 to $3 \frac{1}{10}$ in head; eye $4 \frac{1}{8}$ to $4 \frac{1}{3}$; maxillary $2 \frac{1}{2}$ to $2 \frac{3}{5}$; interorbital $4 \frac{1}{8}$ to $4 \frac{2}{3}$.

Body compressed, evenly fusiform. Head width $2 \frac{1}{4}$ to $2 \frac{2}{5}$ its length. Snout conic, width $1 \frac{1}{3}$ to $1 \frac{2}{5}$ its length. Eye large, with broad adipose-eyelid covering last $\frac{2}{5}$ and hind pupil edge about midway in head length. Jaws about even. Maxillary concealed, extends slightly beyond front eye edge, though not quite to pupil. Single row of nearly even compressed teeth in each jaw, lower laterals little larger; single row of small pointed teeth on each side of vomer and on each palatine. Nostril about midway in snout, small simple pore. Interorbital level. Rakers 13 + 27, lanceolate, $1 \frac{1}{8}$ in filaments, which equal eye. Scales small, those in corselet largest, with about 18 to 22 complete concentric circuli. First dorsal origin little nearer that of soft dorsal than front eye edge, second spine $2 \frac{1}{6}$ to $2 \frac{1}{4}$ in head. Soft dorsal inserted little nearer first dorsal origin than caudal base. Anal inserted little behind soft dorsal origin. Pectoral $2 \frac{1}{3}$ to $2 \frac{1}{2}$ in head; ventral $2 \frac{1}{2}$ to $2 \frac{4}{5}$. In alcohol faded olive-brown above, and paler below, with dull brassy tints. Iris brown. Length 218 to 220 mm. Three from

Mangsi Island and one without locality, though likely from somewhere in the Pacific Ocean.

On account of the proportions of the head, which are much larger than in the Mediterranean and New Jersey examples in the Academy, the above material seems to belong to the Pacific species. Four more examples from Mangsi Island, young, have: Head $3 \frac{1}{4}$ to $3 \frac{2}{5}$; depth 5 to $5 \frac{3}{4}$; snout 3; eye 4; maxillary $2 \frac{2}{3}$ to $2 \frac{3}{4}$; interorbital $4 \frac{1}{5}$; rakers 9+17 in smallest; fin-rays as above; length 63 to 90 mm.

Two drawings by Richard, one labeled Peru.

Scomber microlepidotus Rüppell. Figs. 95 and 96.

Painting of small example by Drayton at Ballabac Straits, February, 1842. "Caught occasionally with the Sardinia, which we took by the bucketsfull alongside the ship."

Germio macropterus (Schlegel). Figs. 97 and 98.

Painting by Drayton of example 2 feet and 10 inches long, from S. Lat. $0^{\circ} 20'$ W. Long. $30^{\circ} 30'$. Also larger example 4 feet 5 inches long from S. Lat. $9^{\circ} 47'$ W. Long. $14^{\circ} 03'$.
~~Germio germio (Lacépède).~~

~~Two paintings without locality may refer to this species, and the smaller represents a younger specimen.~~

~~Scomber sibilans (Schlegel).~~
Germio sibilans (Schlegel) (Melin). Figs. 99 and 100.
Figure of example by W. H. Longal, January 1847, without locality. Also painting by J. F. Drayton, November 10, 1835, without locality.

Also a sketch by Drayton of an example
 taken September 10, 1840, 2. Lat. $8^{\circ}15'$
 W. Long. $161^{\circ}0'$. Dark spot on preopercle
 Back, head above and caudal peduncle
 dark greenish black. Side and belly
 iridescent, with tinge of ultramarine.
 Gill covers iridescent, very bright,
 tinged carmine and silver. Iris silver
 and ultramarine, cornea indigo black.
 Both dorsals gill stone, not very pale.
 Caudal lister and gill stone, quite
 brown. Anal yellowish at end, dark
 slate and flesh color generally. Pectoral
 slate and gill stone, dark slate.
 Ventral black on rays, white between.

The former example is also represented
by a sketch

Scomberomorus commersoni (Lacépède). Fig. 101.

Drawing by Richard of example from Manila.

Acanthocybium solandri (Valenciennes). Fig. 102.

Figure without data. According to the original sketch 4 feet 3 inches in length.

Trichiuridae.

Trichiurus lepturus Linnaeus.

Outline sketch of example from Rio Janeiro.

Coryphaenidae.

Coryphaena hippurus Linnaeus. *Figs. 136 and 137.*

Three paintings, 2 adults and one young. One of the adults was 2 feet, 1 inch, figured by Drayton, was caught by the natives in Hilo Bay, Hawaii, January, 1841. "Native name "Mahimahi".

Stromateidae.

Seriola brama (Günther).

Head $2\frac{1}{2}$?; D. VII, I, 26; A. 11, I, 18; scales about 90 in lateral line to caudal base and 6 more larger ones on latter; about 11 scales (pockets) above lateral line to spinous dorsal origin, and 14 to soft dorsal origin; 20 scales below lateral line to anal origin; 24 predorsal scales; snout $3\frac{1}{4}$ in head from upper jaw tip; eye 6; maxillary $3\frac{1}{8}$; interorbital $2\frac{7}{8}$.

Head well compressed, flattened sides moderately converge below, width half its length. Snout conic, length about $\frac{7}{8}$ its width. Hind eye edge little advanced from middle in head length. Maxillary to eye, upper edge slipping below preorbital; expansion $2\frac{1}{4}$ in eye. Lower jaw slightly protruding, with small symphyseal knob. Teeth small, conic, simple, close-set, uniform, uniserial in each jaw; no teeth on mouth roof or tongue. Inner buccal folds broad.

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Tongue wide, depressed, free and rounded in front. Nostrils inconspicuous, together, hind ones short vertical slit, front one more pore-like, fall about first third of snout as seen in profile. Interorbital elevated convexly, gives median ridge to occiput. Preopercle broad, edge crenulated. Scales rather caduceous, most remain in lateral line; radiating basal striae 3 or 4; circuli 33 to 83; cheek with 6 rows of scales; lateral line straight from shoulder to caudal base, tubes simple, well exposed.

Dorsal spines all small, third or longest about $1 \frac{1}{5}$ in eye. Soft dorsal origin nearer snout tip than caudal base, first branched ray about $2 \frac{7}{8}$ in head. Anal inserted about opposite middle of dorsal, first branched ray about $3 \frac{3}{4}$ in head; pectoral $1 \frac{3}{5}$; ventral $2 \frac{2}{3}$; upper caudal lobe $1 \frac{1}{3}$. In alcohol uniform dark brownish, without markings. Apparently lower surface paler when fresh. Head, and skin of trunk with fins, about 610 mm., long. No locality, though doubtless from New Zealand.

It agrees largely with Waite's account.⁹⁶

Serioclella crassus (Starks). *Fig-138.*

Painting of an example from Callo, July, 1839, by Drayton.

Chondroplites sinensis (Euphrasen). *Fig-139.*

Figure by Richard of Singapore example.

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Seserinus paru (Linnaeus). 757-140.

Head 3 to $2\frac{1}{2}$; depth $1\frac{1}{6}$ to $1\frac{1}{2}$; D. III, iv or v, 39 to 41; A. III or IV, iii or iv, 37 to 39; tubes about 85 to 88 in lateral line; snout $3\frac{2}{5}$ to $4\frac{1}{4}$ in head from upper jaw tip; eye $3\frac{1}{8}$ to $4\frac{1}{5}$; maxillary 3 to $3\frac{4}{5}$; interorbital $2\frac{1}{5}$ to $2\frac{3}{4}$.

Body greatly compressed, lower half deeper than upper half, which nearly evenly convex in front profile; caudal peduncle compressed. Head width $1\frac{3}{4}$ to 2 in its total length. Snout short, convex, snub-nosed, length about half its width. Hind eye edge midway in snout length; adipose-eyelid narrowly marginal, absent in young. Mouth broad, small, closed lower jaw included. Maxillary small, inclined, not reaching eye, longer in young. Teeth uniserial in jaws, small, compressed, very close-set, slender, ends tricuspid in adult, simple in young. Nostrils very small, together, close before and above eye. Interorbital greatly elevated convexly. Rakers 5+12 to 15, about two in filaments and latter $1\frac{1}{4}$ in eye. Scales mostly minute, larger on hind median portion of trunk, cover greater portions of vertical fins; basal striae 5 to 12; circuli about 40; young with non-striate scales and circuli about 30 to 33; lateral line continuous, arched mostly concurrently with dorsal profile and extends down to middle of caudal base.

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Soft dorsal inserted close behind pectoral origin, with front elevated lobe little longer than pectoral or $2 \frac{1}{8}$ to $2 \frac{2}{3}$ in combined head and trunk. Front anal lobe longer, also much longer in half-grown, $1 \frac{2}{5}$ to $2 \frac{1}{3}$ in head; pectoral $2 \frac{1}{2}$ to $3 \frac{3}{4}$, largest in half-grown. In alcohol brown, sides paler. Length 85 to 185 mm.

Drawing by Richard from Rio Janeiro. These examples invite comparison with material in the Academy from Colon, Panama, Nantucket, and a young specimen, also without locality, all of which are included above.

In no way can we separate the Wilkes specimens. Unfortunately the larger scales have all fallen from our largest (Nantucket) example.

Fowler has erroneously identified an example⁹⁷ as S. xanthurus Quoy and Gaimard, as Riberio has suggested that Quoy and Gaimard's species possibly belongs in Poronotus Gill⁹⁸. This is in view of the description of "la ligre latérale supérieure est très recourbée vers le haut, tandis que l'inférieure est horizontale et à peine sensible".

However Quoy and Gaimard also state "corps orbiculaire, très comprimé, parvu le grandes nageoires en dessus et en dessous". The dorsal rays are described as "les six premiers s'allongent en filaments," the anal is also said to be very large, and faniform, and "les écailles sont imperceptibles". Rhombus argentipinnis Cuvier, R. crenulatus Cuvier and R. orbicularis Guichenot were placed as

⁹⁷ Proc. Acad. Nat. Sci. Phila., 1906, p. 119.

⁹⁸ Arch. Mus. Nac. Rio Janeiro, vol. 17, 1915, p. 4

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synonyms of Seserinus xanthurus Quoy and Gaimard by Jordan and Evermann⁹⁹, though how correctly is speculation.

Attention may be called to the fact that Seserinus Oken¹⁰⁰ would clearly replace Peprilus Cuvier¹⁰¹, if indeed the two, are synonymous? Jordan and Evermann in order to preserve the name Seserinus as derived from the non-binomial Rondelet (which appears irrelevant to the correct designation of the type, as the name properly begins with Oken in 1817) are thus led to evolve Seserinus rondeleti Cuvier as its type, a species thought to be the Mediterranean Centrolophus microrchirus Bonelli¹⁰². We are unable to accept their contention. From this it is therefore clear Seserimus Oken is the correct name for the harvest-fishes. Should Seserimus xanthurus Quoy and Gaimard prove to belong with Poronotus Gill, the latter name must give way to Peprilus, as its type species P. crenulatus has been considered as a synonym. The species would then become Peprilus xanthurus (Quoy and Gaimard) and Peprilus triacanthus (Peck).

⁹⁹ Bull. U.S.Nat.Mus., no. 47, vol. I, 1896, p. 966.

¹⁰⁰ Isis, 1817, p. 1781. Based on Cuvier, Regne Animal, vol. 2, 1817, p. 342. Type Chaetodon alepidotus Linnaeus, monotypic.

¹⁰¹ Regne Animal, Ed. 2, vol. 2, 1829, p. 214. Type P. crenulatus Cuvier, monotypic.

¹⁰² Stanford Univ. Pub., 1917, p. 106.

Carangidae.

Scomberoides lysan (Forskål). *Fig-103.*

Head $4 \frac{2}{5}$; depth $2 \frac{4}{5}$; D. I, VII I, 1, 18; A. II, I, 16; snout 5 in head from upper jaw tip; eye 5; maxillary $1 \frac{3}{5}$; interorbital $3 \frac{2}{5}$.

Body strongly compressed. Head width $2 \frac{1}{2}$ its length. Snout conic, length $\frac{2}{3}$ its width. Eye center about first third in head; eye-lids free, adipose-like marginally but not extending in iris. Mouth large, very oblique. Mandible little protruded. Teeth conic, simple, subequal; upper uniserial except short inner row in front; lower biserial and outer row rather inclined outward; minute villiform teeth on vomer, palatines, pterygoids and tongue. Maxillary extends nearly an eye-diameter beyond eye, expansion slightly less than pupil. Nostrils together, close before eye. Interorbital convex. Lanceolate infraorbital extends back ensheathing maxillary nearly to its greatest expansion and well beyond eye. Rakers $2+10$, lanceolate, $1 \frac{3}{5}$ in filaments which $1 \frac{1}{4}$ in eye. Scales rather broadly triangular,

basally more elongate; circuli mostly complete, about 40 and little coarser apically. Several of larger median dorsal spines very slightly overlapping. Soft dorsal inserted about midway between front eye edge and caudal base; first branched ray $1 \frac{1}{3}$ in head. Soft anal origin little more advanced or about midway between mandible tip and caudal base; first branched ray $1 \frac{1}{5}$ in head; pectoral $1 \frac{1}{2}$; ventral $1 \frac{4}{5}$. In alcohol leaden-brown on back, sides and below white with silvery tints. Head white below eye. Iris brownish. Fins pale brownish. Length 270 mm. (caudal tips damaged). Manila.

Compared with Sumatran examples of S. tolooo (Cuvier) in the Academy, this species differs in the lanceolate infraorbital extending down behind along maxillary and the latter extending much behind eye. Much larger examples of S. tolooo show elongated and pointed diamond-shaped scales, the apical portion quite narrowly pointed, though less slender than the basal and the circuli about 25 to 30.

Scomberoides tolooo-parah (Rüppell) *Fig. 104.*

Head 4 to $4 \frac{7}{8}$; depth $3 \frac{1}{5}$ to 4; D. I. VII-I, 20; A. II-I, 18; snout $3 \frac{1}{5}$; maxillary $1 \frac{3}{4}$ to 2; interorbital $3 \frac{1}{4}$ to $3 \frac{3}{4}$; rakers 7 or 8 17 or 18; length 92 to 449 mm. Five examples of which 2 from Hilo and the others without locality, though likely Polynesian? *Figure of a small example, by J. H. Richard, from Samoa.*

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Fig. 105
and 106

Semiberoides sancti-petri (Cuvier).

A painting of an example from Hilo Bay, June 19, 1841.
Native name "lai". Drawing by ^{J. H.} Richard of a Hilo example,
~~and still one from Samoa.~~

We have compared examples in the Academy, from Honolulu, Samoa and the Philippines, all of which agree. The scales differ from those of S. lysan as in the adults they are more elongate or with basal narrow portion $\frac{2}{3}$ length, though in young little less than apical. Circuli coarser, about 25 to 30 in adult and about 10 in young. Christmas Island, Polynesian and Manila material in the Academy, reported by Fowler as S. moluccensis, ⁷¹ belong to S. ~~tolos~~
~~parva~~ sancti-petri.

⁷¹ Proc. Acad. Nat. Sci. Phila., 1905, p. 56, fig. 1.

Oligoplites saurus (Schneider). Fig. 107-

Head 4 to $4\frac{2}{3}$; depth $3\frac{1}{2}$ to $3\frac{5}{6}$; D. I, V - I, 19 or 20; A. II, 19 to 21; snout $3\frac{1}{8}$ to $3\frac{7}{8}$ in head from upper jaw tip; eye $3\frac{1}{2}$ to $4\frac{1}{2}$?; maxillary $1\frac{2}{3}$ to $1\frac{7}{8}$; interorbital $3\frac{2}{5}$ to $3\frac{3}{4}$.

Body elongately ovoid. Head width $2\frac{1}{4}$ to $2\frac{2}{5}$ in total head length. Snout conic, long as wide. Eye with hind edge midway in head length, hind pupil edge midway in young; mouth large, well inclined, lower jaw very slightly protruded. Maxillary to hind eye edge, slightly beyond pupil in young. Teeth

biserial in jaws, lower outer slightly longer; villiform teeth on vomer, palatines and tongue. Nostrils about last third in snout. Interorbital convex, with median trenchant keel. Infraorbitals and suborbitals broad, lower wider, though little less than eye or about $1/3$ in young. Rakers 5 to 7 12 to 15, lanceolate, very slightly less than filaments, which also slightly less than eye. Scales elongate, slender, very compact. Lateral line with slight arch over pectoral. Fourth erect dorsal spine largest about 3 to $3 \frac{7}{8}$ in head. Soft dorsal inserted slightly nearer snout tip than caudal base, or slightly nearer latter in young; first branched dorsal ray $1 \frac{3}{4}$ to 2 in head; first branched anal ray $2 \frac{1}{8}$ to $2 \frac{1}{3}$; pectoral $1 \frac{3}{5}$ to $1 \frac{4}{5}$; ventral $1 \frac{2}{3}$ to $1 \frac{7}{8}$. In alcohol leaden-brown above, sides from level with eye below bright silvery-white. Fins all pale brownish, ventrals burnished with silvery-white. Length 115 to 175 mm. One without locality, though likely from Rio Janeiro? We have also included examples in the Academy from North Carolina, Florida, Porto Rico and Trinidad, in the above account.

O rathbuni Ribeiro is said to differ in its rakers $3+13$ and eye $3 \frac{1}{6}$ in head?

Oligoplites saliens (Bloch). *Fig. 105.*

Head $4 \frac{1}{6}$; depth $3 \frac{1}{4}$; D. I. IV. I, 20; A. II - L. 19; snout 4 in head from upper jaw tip; eye 4; maxillary $1 \frac{1}{2}$; interorbital 3; rakers II. $4+9$, III; length 275 mm. One without locality,

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though doubtless obtained at Rio Janeiro? We have compared it with examples in the Academy from the same place and another from Trinidad.

Drawing by Richard of example from Rio Janeiro.

Caesiomorus glaucus (Linnaeus). *Fig. 109.*

Figure by Richard of example from Cape Verde.

Naucratus ductor (Linnaeus). *Fig. 110.*

Head $3 \frac{4}{5}$; depth $4 \frac{3}{4}$; D. V, 1, 27; A. II - 1 16; scale rows about 188 along lateral line to caudal base; about 76 pores in l.l. to keel along caudal peduncle side; 31 scales above l.l. to soft dorsal origin, 31 below to spinous anal origin; 50 predorsal scales; snout $3 \frac{1}{4}$ in head; eye $5 \frac{2}{5}$; maxillary 3; interorbital $2 \frac{7}{8}$. Head width half its length. Snout conic, length about $\frac{9}{10}$ its width. Eye little before middle in head; $1 \frac{3}{4}$ in snout. Mouth oblique, jaws about even. Maxillary to eye, expansion $1 \frac{1}{2}$ in eye. Teeth fine, in bands in jaws, on vomer and palatines. Interorbital convex. Opercle with radiating striae. Rakers ~~6~~ 19, lanceolate, $1 \frac{2}{5}$ in filaments, which equal eye. Scales with 2 or 3 radiating basal striae, with edge scalloped and circuli rather coarse, especially apically; 10 rows of scales below eye to middle of preopercle ridge. In alcohol dull brown, with 6 broad transverse bands, darkest in back and extend in vertical fins. Lower body surface pale. Fins dull brown, lower ones with whitish marginally and especially front or lower sur-

face of ventral rays. Length 223 mm. ^{Pu}Jahn.

Jordan and Evermann state that "the earliest evidence we have of the occurrence of this fish among the Hawaiian Islands is that furnished by a painting made by Mrs. J. B. Dillingham from a specimen obtained by her in the Honolulu market. The painting was examined by us and is undoubtedly of this species, which is locally known as annexation fish, having appeared at the date of the annexation of Hawaii to the jurisdiction of the United States".⁷³ These remarks are thus largely discounted by the discovery of one specimen, evidently captured years before.

⁷³

Bull. U.S. Fish Com., vol. 23, pt. 1, 1903(1905), p. 182.

Decapterus punctatus (Eydoux and Souleyet). *Fig. III.*

Head $3 \frac{5}{6}$ to 4; depth $4 \frac{7}{8}$ to $5 \frac{1}{5}$; D. VIII - 1, 32 to 34 1; A. II - 1, 26 to 29 1; scutes in lateral line 29 to 36, of which last 7 to 12 on caudal base; snout 3 in head from upper jaw tip; eye $3 \frac{1}{4}$ to 4; maxillary $2 \frac{3}{4}$ to $3 \frac{1}{8}$; interorbital $3 \frac{1}{4}$ to 4; elongately fusiform, but moderately compressed. Head width $1 \frac{7}{8}$ to 2 in its length. Snout conic, width $1 \frac{1}{4}$ to $1 \frac{1}{3}$ its length. Eye large, with broad adipose-eyelid in front and behind, hind pupil edge about midway in head length from snout tip. Mouth small, lower jaw protruded. Maxillary not quite to eye; expansion 2 in eye. No teeth. Interorbital broadly convex. Rakers 10 to 12 + 37 to 40, lanceolate, 1 to $1 \frac{2}{3}$ in filaments or $1 \frac{1}{2}$ to $1 \frac{7}{8}$ in

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eye. Scales mostly fallen, with 32 to 58 parallel fine
circuli; armed section of ~~lateral line~~ ^{lateral line} about $1\frac{3}{4}$ to $3\frac{1}{5}$ (latter
in adult) in scaly portion. Spinous dorsal origin about
midway between hind eye edge and soft dorsal origin, near-
er latter in young; third spine $1\frac{7}{8}$ to 2 in head; soft
dorsal origin nearer caudal base than snout tip. Anal
like soft dorsal, only smaller. Pectoral $1\frac{1}{2}$ to 2 in head;
ventral $2\frac{1}{4}$ to $2\frac{1}{2}$. In alcohol faded dull olive-brown on
back, sides and below pale to whitish with silvery reflec-
tions. Dusky-brown blotch on upper hind opercle edge about
half size of pupil. Fins all pale. Length about 188? to
300 mm. One from Oahn and 2 without locality, probably
Pacific.

Drawing of example from Maui, by Richard.

Although Jordan and Seale described D. lundini as a
new Samoan species⁷⁴, and their description indicates the
detached dorsal and anal finlet, such is not shown in their
figure of the type specimen. If the latter is correct it
would more likely represent a Caranx. Its long pectoral
fin is unlike that of any Caranx known to us.

Trachurus declivis Jenyns. *Fig. 112 and 113.*

Head $3\frac{3}{4}$; depth $4\frac{1}{8}$; D. I, VII - I, 30; A. II - I,
29; scales ~~36~~ 36 in lateral line; snout $3\frac{1}{4}$ in head from
upper jaw tip; eye $4\frac{1}{3}$; maxillary $2\frac{3}{5}$; interorbital $3\frac{2}{5}$.

⁷⁴Bull. Bur. Fisher. U.S., vol. 25, 1905 (1906), p. 229, fig. 27.

Body elongately fusiform, well compressed. Head width half its length. Snout conic, about long as wide. Eye with hind pupil edge slightly advanced from center in head length; adipose-eyelid broad, extends over iris in front and behind to pupil. Lower jaw slightly protrudes. Teeth in minute band in jaws, more obsolete on vomer. Maxillary extends little beyond eye front, though not quite to pupil; expansion $1 \frac{3}{4}$ in eye; upper edge entirely slips below preorbital. Nostrils at last fourth in snout. Interorbital broadly convex. Rakers $16+42$, lanceolate, fine, long as filaments or about $1 \frac{1}{4}$ in eye. Scales with 2 or 3 converging striae, very fine circuli to to 100; scute width about equals eye. Spinous dorsal origin slightly before first third in pectoral; third erect spine $1 \frac{2}{3}$ in head. Soft dorsal origin midway between nostril and caudal base. Anal inserted little posterior. Pectoral about pupil diameter longer than head. Ventral $1 \frac{4}{5}$ in pectoral. In alcohol dull brown, back with olive tint. Obsolete dusky blotch on opercle little over half of pupil. Length 258 mm. New Zealand.

Also an example from Sydney, which shows: Head $3 \frac{1}{2}$; depth $4 \frac{1}{3}$; D. I, VIII - I, 29; A. II - I 28; scutes $35+39$, wide as eye; snout $3 \frac{1}{4}$ in head from upper jaw tip; eye $3 \frac{1}{4}$; maxillary $2 \frac{2}{5}$, interorbital $3 \frac{1}{4}$; rakers about $15+40$; length 140 mm. (caudal tips damaged).

Ogilby places this species as a synonym of Scomber trachurus Linnaeus, which has been shown to apply to the Mediterranean species, later called T. mediterraneus by Steindachner. It therefore follows that the North Atlantic form becomes T. semispinosus (Nilsson), of which we have examined a single example, and that obtained at the Cape of Good Hope. It differs from the above noted New Zealand fish in more gill-rakers (48) on the lower part of the first arch. Compared with Jenyns' account and figure of his Caranx declivis certain minor details do not agree. For instance Jenyns gives D. 35; A. 30 (figure shows 34); scutes 81 or 82 (figure shows 39+43). It thus appears T. declivis is closer to T. semispinosus than to T. picturatus (Bowdich). Of the last Fowler examined a series from the Azores⁷⁵, and found far more scutes, likewise T. symmetricus from California. Waite gives T. picturatus as the New Zealand species⁷⁶, with D. 29, A. 26, scutes 44+41, all within the possible range of variation for T. declivis.

⁷⁵ Proc. U.S. Nat. Mus., vol. 56, 1919, p. 198.

⁷⁶ Rec. Canterbury Museum, vol. I, No. 3, 1911, p. 232.

Selarocrumenophthalmus (Bloch). *Fig. 114.*

Head $3 \frac{1}{6}$; depth $4 \frac{1}{8}$; D. VIII - I, 26; A. II - I, 22 or 23; lateral line 53 to 58 33; snout $3 \frac{1}{5}$ to $3 \frac{1}{4}$ in head from upper jaw tip; eye $3 \frac{1}{8}$ to $3 \frac{1}{6}$; maxillary 2 to $2 \frac{1}{8}$; interorbital $3 \frac{4}{5}$ to 4; rakers 11+28. Two without locality/ Slightly smaller examples in the Academy

from the West Indies show scutes 34 or 35, though in every way agree.

Drawing by Richard, 125 mm. long, labeled Cape Verde.

Alepes marginata (Bleeker).

Head $2 \frac{3}{4}$; depth $2 \frac{1}{2}$; D. I, VIII - I, 22; A. II - I, 18; scutes 43 in straight section of lateral line to caudal base and 7 more on latter; snout $3 \frac{3}{5}$ in head from upper jaw tip; eye 3; maxillary $2 \frac{2}{5}$; interorbital 5; head width 3 in total head length.

Body strongly compressed. Snout compressed, width $\frac{7}{8}$ its length. Eye large, advanced, hind pupil edge about midway in head length from upper jaw tip. Mouth large, lower jaw protruding. Maxillary greatly inclined, about first fifth in eye, not to pupil; expansion 2 in eye. Narrow bands of minute teeth in jaws, on vomer and palatines. Interorbital convex. Rakers about $10 + 28$, finely elongate, slender, slightly longer than filaments or $1 \frac{1}{2}$ in eye. Scales fine, cycloid, circuli about 10 basally and 10 apically. Arch of lateral line $1 \frac{1}{5}$ in straight section to caudal base. Scutes moderately wide, each with narrow point. Straight section of ~~lateral line~~ ^{lateral line} begins little behind soft dorsal origin. Color in alcohol pale brown on upper surface of head and back. Sides and lower surface uniform silvery-white. Fins all pale brown. Cluster of obsolete dusky dots on upper hind portion of opercle, less than pupil in extent. Length 38 mm. Cape de Verde Islands.

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We think our specimen the young of Bleeker's species, in that it agrees in the numerous lateral scutes, branched dorsal and anal rays, scaled breast and absence of a dark-opercular spot.

In this connection we note that Bleeker's name Pseudocaranx falls as a synonym of his earlier Uraspis, if the two names are really defined by the same characters.

Caranx hasseltii (Bleeker).

Head $3 \frac{1}{8}$, depth $2 \frac{2}{3}$; D. I, VIII - I, 24?; A. II - I, 19; scales 40? 38 in lateral line, last 8 scutes on caudal base; snout $3 \frac{3}{4}$ in head; eye 3; maxillary $2 \frac{1}{8}$; interorbital 4; rakers $11 + 32$; length 44? mm. Fiji. Compared with an example in the Academy 130 mm., long from the Philippines, we find the latter has 40 specimen scutes in the straight section of the ^{lateral line} ~~l. l.~~ and the rakers as above.

Caranx ignobilis (Forsk.) *Fig. 115.*

Head $3 \frac{1}{6}$ to $3 \frac{1}{4}$; depth $2 \frac{1}{4}$; D. I, VIII - I, 19 or 20; A. II - I, 16 or 17; scales 66 or $67 + 30$ to 33 in lateral line; snout 3 in head from upper jaw tip; eye $4 \frac{1}{4}$ to $4 \frac{1}{2}$; maxillary $2 \frac{1}{6}$ to $2 \frac{1}{5}$; interorbital $3 \frac{1}{2}$ to $3 \frac{2}{3}$; rakers II, 2 or 3 14, 11, or 15, 1, lanceolate, equal filaments or $1 \frac{3}{4}$ in eye; length 145 to 200 mm. One Hawaiian and the other without locality, probably Pacific?

Compared with the Sumatran example of C. sem. described by Fowler⁷⁷, in the Academy. All show the breast ventrally and in front of ventral, except median small ellipsoid scaly patch,, naked. Scales of all non-striate, with 35 to 45 circuli,

⁷⁷ Proc. Acad. Nat. Sci. Phila., 1905, p. 79

variously complete, though smaller number in the Sumatran example. All are therefore to be referred to C. ignobilis.

Drawing by Richard of example from Hilo.

Caranx crysos (Mitchill). *Fig. 116.*

A small example, 77 mm. long (caudal damaged) without locality, may have been from Rio Janeiro? It shows: Head $3 \frac{1}{3}$; depth $2 \frac{2}{3}$; D. I, VIII - I, 26; A. II - I, 24; scales $55+45$ in lateral line; snout $3\frac{1}{4}$ in head from upper jaw tip; eye $3 \frac{2}{3}$; maxillary $2 \frac{2}{3}$; maxillary $2 \frac{2}{3}$; interorbital $3 \frac{1}{8}$. Contour evenly ellipsoid. Head width half its total length. Snout about long as wide. Hind pupil edge about midway in head length. Mouth oblique, lower jaw slightly protruded. Maxillary beyond front eye edge but not quite to pupil; expansion $1 \frac{2}{3}$ in eye. Teeth minute, little developed, few as single row in each jaw, minute teeth on vomer, palatines and tongue. Nostrils together at last third in snout. Interorbital convexly elongated, median keel midway to occiput. Rakers about $15+32$, finely lanceolate, $1 \frac{1}{6}$ in eye; filaments about $\frac{2}{3}$ of rakers. Scales adherent, nonstriate, circuli 17 to 28; scute width $2 \frac{2}{3}$ in eye; curve of ~~lateral line~~ ^{lateral line} $1 \frac{1}{6}$ in straight section. Soft dorsal origin midway between eye center and caudal base. In alcohol brownish, paler below. Fins all brown. Opercular spot small, faded.

Another young example, likewise without data, 88 mm.? may also have been from Rio Janeiro? It shows: Head $3\frac{1}{4}$, depth $2 \frac{3}{5}$; D. I, VIII - I, 23; A. II - I, 19; scales $58+45$ in ~~lateral line~~ ^{lateral line};

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snout $3 \frac{1}{5}$ in head from upper jaw tip; eye $3 \frac{1}{2}$; maxillary $2 \frac{1}{6}$; interorbital $3 \frac{1}{8}$; rakers $8+20$; opercular spot apparently faded?

Following Mr. Nichols⁷⁸ we identify C. pisquetus Cuvier and C. caballus Gunther with the present species. Of the former we have an example 240? mm. long (caudal damaged); without locality, which may also have been brought from Rio Janeiro? It shows: Head $3 \frac{1}{2}$; depth $3 \frac{1}{5}$; D. I, VIII - I, 22; A. II - I, 20; scales $45+44$ in l.l.; snout $3 \frac{1}{4}$ in head; eye $4 \frac{1}{10}$; maxillary $2 \frac{1}{3}$; interorbital 4; rakers $12+23$; opercular spot not obsolete. Ribeiro⁷⁹ gives the scutes for C. crysos as 47 to 50 and his figure shows them less than 50.

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⁷⁹ Copeia, April 15, 1920, no. 81, p. 29.

Arch. Mus. Na. Rio Janeiro, vol. 17, 1915, p. 19.

This is in perfect agreement with the larger example described and figured by Fowler. Its scales are simple, cycloid, and fine circuli about 54 to 60. Examples of C. crysos in the Academy from Rhode Island and New Jersey show 50 to 55 scutes in l.l. and rakers 10 to 15+26 to 28.

Caranx caballus (Günther). *Figs. 116a.*

Head $2 \frac{2}{3}$; depth 2; D. I, VII - I, 28; A. II - I 23;
scales 50 42? in ~~l.l.~~ lateral line lateral line; curve of ~~l.l.~~ $1 \frac{3}{5}$ in straight section;
snout 4 in head; eye 3; maxillary $2 \frac{1}{3}$; interorbital $4 \frac{1}{2}$; rakers

about 7+18. Also another, 25 mm.; from Valparaiso. D.I, VII, 21, A. III, 21; scutes in ~~III~~^{lateral line}, undeveloped; preopercle spines strong and conspicuous; soft anal fin nearly long as soft dorsal. Chili. Length 41 mm.

Caranx latus Agassiz. *Fig. 117.*

Head $3\frac{1}{4}$; depth $2\frac{1}{4}$; D. I, VIII - I, 22; A. II - I, 19; scales 60+43 in lateral line; snout 3 in head; eye 4; maxillary $2\frac{2}{5}$; interorbital $3\frac{1}{2}$; rakers 8+18; length 128 mm. Sulu.

This example is intermediate between the types of C. semisomnus Fowler,⁸⁰ which may be suppressed as a synonym. It has no opercular spot and the breast is entirely scaled. Its scales are simply cycloid, with 37 to 46 circuli, whereas the Sulu example shows about 32 circuli, a condition of age.

Another small example in the Wilkes collection, 88 mm. long, without locality. It agrees largely with the small paratype of the nominal C. semisomnus, and differs slightly only in the smaller scutes, little larger from dorsal and anal lobes and absence of an opercular spot. In the small paratype of C. semisomnus the scutes are 35 and rakers 5+16. Seale has identified C. semisomnus with C. sexfasciatus,⁸¹ but it could hardly be identified with that species.

⁸⁰ Journ. Acad. Nat. Sci. Phila., (2)12, 1904, p. 510, pl. 16.

⁸¹ Philippine Journ. Sci., vol. 5, 1910, p. 270

Caranx forsteri Cuvier.

Head 2 9/10; depth $2\frac{1}{2}$ to $2\frac{7}{8}$; D. I, VIII - I, 20 to 22; A. II - I, 16 or 17; scales 46 to 56 + 31 or 32; snout $3\frac{1}{2}$ to 4 in head from upper jaw tip; eye $3\frac{1}{6}$ to $3\frac{3}{5}$; maxillary 2 to $2\frac{1}{10}$; interorbital $3\frac{1}{4}$ to $3\frac{3}{4}$.

Body well compressed, evenly fusiform. Head width 2 to $2\frac{1}{4}$ in total head length. Snout width about $\frac{7}{8}$ its length. Hind pupil edge about midway in head length, little advanced in young. Adipose-eyelid covers about last fourth of age, less in young. Lower jaw slightly protruded. Maxillary nearly to hind pupil edge; expansion 2 in eye. Teeth conic, slightly enlarged in front of jaws; few small short teeth in inner row above; minute teeth on vomer; palatines and tongue. Nostrils together, close before eye. Interorbital convex. Rakers iv or v, 3 or 4 + 14, iii or iv, lanceolate. Scutes without striae; circuli 17 to 40; breast entirely scaled; curve of lateral line $1\frac{1}{2}$ to $1\frac{3}{5}$ in straight section. Third erect dorsal spine $2\frac{2}{5}$ to $2\frac{3}{4}$ in head. Soft dorsal inserted about midway between eye-center and caudal base, first branched ray $1\frac{4}{5}$ to 2; pectoral but little shorter or equals head; ventral $2\frac{1}{8}$ to $2\frac{1}{4}$. On alcohol brownish, much paler below. Fins all dull brown. Two from Fiji, one from Tahiti and one from Sulu. Length 98? to 138 mm.

An adult example in the Academy from Apia, Samoa, identified as C. sexfasciatus Jordan and Seale⁸² agrees with two Honolulu examples recorded as C. marginatus Fowler⁸³. All show the eye 4 in the head and the small dusky spot at the upper corner of the opercle. We follow Nichols⁸⁴ in writing C. marginatus Gill and C. rhabdotus Jenkins with the present species, after an examination of the types of all three. Our examples of C. forsteri show the curve of the ^{lateral line} ~~fin~~, $1\frac{1}{2}$ to 1 3.5 in the straight section.

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Bull. Bur. Fisher. U.S., vol. 25, 1905 (1906), p. 230.

83 Proc. Acad. Nat. Sci. Phila., 1905, p. 81.

84 Bull. Amer. Mus. Nat. Hist., vol. 28, 1910, p. 159.

Caranx sexfasciatus Quoy and Gaimard. *Figs. 118 to 120 -*

Head 3 to $3\frac{1}{4}$; depth $2\frac{1}{2}$ to $2\frac{2}{3}$; D. I, VIII - I, 19 to 21; A. II - I, 15 to 17; scales 48 to 50 + 30 to 37; snout $3\frac{1}{5}$ to 4 in head from upper jaw tip; eye 4 to $5\frac{1}{5}$; maxillary $2\frac{1}{8}$ to $2\frac{1}{6}$; interorbital $3\frac{1}{4}$ to $3\frac{3}{5}$

Body fusiform, front profile evenly convex. Head width 2 to $2\frac{1}{8}$ in its length. Snout length $\frac{7}{8}$ to 1 in its width. Eye always less than snout, hind edge about midway in head. Mouth moderate, lower jaw slightly protruding. Maxillary to hind pupil edge; expansion $1\frac{1}{4}$ to $1\frac{3}{4}$ in eye. Teeth small, conic, in single row in each jaw, front ones little enlarged, short and inner row of few smaller ones

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in front above, scarcely evident below; villiform teeth on vomer, palatines and tongue. Nostrils together, close before eye. Interorbital elevated convexly. Rakers IV or V, 2 to 3+17 or 18, lanceolate, about equal filaments or $1 \frac{1}{5}$ in eye. Scales simple, cycloid, with about 22 to 34 circuli. Third dorsal spine $2 \frac{1}{5}$ to $2 \frac{1}{2}$ in head. Soft dorsal origin slightly nearer caudal base than snout tip or about midway between nostrils and caudal base, first branched ray $1 \frac{7}{8}$ to 2 in head; first branched anal ray 2; pectoral long as or little longer than head; ventrals 2 to $2 \frac{1}{4}$. In alcohol brown, paler below. Fins pale uniform brown. No opercular spot. Length 95 to 128 mm. Two from Sulu.

Compared with examples of C. forsteri of similar size that species is found to have a conspicuously larger eye. Caranx sexfasciatus Quoy and Gaimard⁸⁵ is based on a young example about 58 mm. long without a dark opercular spot. The figure shows the eye about $3 \frac{3}{5}$ in head and maxillary reaching opposite hind pupil edge.

Three drawings by Richard, one each, representing a specimen from Samoa, Fiji and Tahiti, are likely the present specimens.

⁸⁵ Voy. Uranie Zool., 1824, p. 358, Pl. 56, fig. 4. Îles de Papons.

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Caranx passer Valenciennes. 7-12/1000/122.

Head $3 \frac{1}{6}$ to $3 \frac{2}{5}$; depth $2 \frac{1}{2}$ to $2 \frac{2}{3}$; D. I, VIII- I, 25 to 27; A. II - I, 23; scales 80 to 92+25 to 27; tubes about 75 in lateral line; snout $2 \frac{3}{4}$ to 3 in head from upper jaw tip; eye $4 \frac{1}{4}$ to ; maxillary $2 \frac{4}{5}$ to $3 \frac{1}{8}$; interorbital 3 to $3 \frac{7}{8}$.

Body strongly compressed, evenly fusiform. Head width 2 to $2 \frac{1}{4}$ in its length. Snout width $1 \frac{1}{4}$ its length. Hind pupil edge about midway in head length. Mouth small, lower jaw slightly protrudes. Maxillary little beyond nostril, not quite to eye; expansion 2 in eye. Teeth in jaws short, rather blunt, biserial; teeth on palatines and vomer. Nostrils small, together, near last $\frac{2}{5}$ in snout. Interorbital convex. Rakers 10 or 11+22 or 23, lanceolate, little longer than filaments or $1 \frac{1}{4}$ in eye. Scales mostly adherent, basal striae 2 or 3 and circuli moderate; breast below pectoral covered with small scales; lateral line well arched to straight section, about $1 \frac{1}{3}$ to $1 \frac{2}{3}$ its upper curved section. Dorsal spines moderate. Soft dorsal inserted about midway between nostrils and caudal base. Pectoral about half an eye-diameter shorter than head; ventral 2 in head. In alcohol dull brownish, with faded silvery reflections, back bluish gray. Blackish spot on hind opercle edge about half size of pupil. Fins all pale or dull brownish. Spinous dorsal and soft dorsal lobe, dusky. Length 208 to 235 mm. One from Sydney in the Wilkes collection, and 3 from Victoria in the Academy.

Painting of an example by Drayton, March, 1840, labeled "Bat of Islands, New Zealand. Numerous".

Drawing by Richard of example from Sydney.

Caranx ascensionis (Osbeck).

Head $3 \frac{2}{5}$; depth $2 \frac{2}{3}$; D. I, VIII - I to 22; A. II - I, 19; scales about $75+30$; snout $2 \frac{7}{8}$ in head from upper jaw tip; eye $4 \frac{4}{5}$; maxillary $2 \frac{3}{5}$; interorbital $3 \frac{3}{4}$.

Body well compressed, oblong. Head width $2 \frac{1}{5}$ its total length; median keel above nostrils, forming gibbous profile. Snout compressed, width $1 \frac{1}{5}$ its length. Eye with hind pupil edge about midway in head length; broad adipose-lid covering last third of eye. Mouth little inclined from horizontal lower jaw slightly protruding. Maxillary to pupil; expansion $1 \frac{2}{5}$ in eye. Two of conic teeth in each jaw, little larger in front and above followed by narrow band of villiform ones close behind; lower teeth closer set and little smaller than upper outer ones; villiform teeth on vomer, close before eye or about last fifth in snout. Interorbital elevated convexly. Rakers $5+21$, lanceolate, equal filaments or $1 \frac{2}{3}$ in eye. Scales adherent, simple, cycloid; circuli about 50 to 55; cheek scales 22; breast entirely covered with close-set scales. Soft dorsal origin about midway between snout tip and caudal base; fin elongate, pointed front lobe $1 \frac{1}{3}$ in fin base. Front anal lobe $1 \frac{1}{8}$ in head; ventral $2 \frac{1}{6}$. Pectoral long, falcate, about reaches 14th scute in lateral line.

In alcohol dark brown, nearly uniform everywhere. No traces of spot on opercle. Length 285 mm. (caudal ends damaged). No locality, though probably from the tropical Atlantic, likely Rio Janeiro?

The above agrees with the account and figure by Valenciennes. It therefore follows that Scumber adscensionis (Forster) Osbeck⁸⁶ is the earliest name for the species.

Two very young examples of Caranx from Rio Janeiro are likely the present species. They have D. I, VII, 23 and A. III, 22.

⁸⁶

Voy, China, vol. 2, 1771, p. 94.

Caranx djeddaba (Forskål). *Fig. 123.*

Drawing by Richard of example from Manila.

Caranx melampygus Cuvier. *Fig. 124 to 126.*

Head $3 \frac{1}{3}$; depth $2 \frac{2}{3}$; D. I, VIII - I, 23; A. II - L, 19; scales 55 40; snout $2 \frac{4}{5}$ in head from upper jaw tip; eye $4 \frac{2}{3}$; maxillary $2 \frac{1}{3}$; interorbital $3 \frac{7}{8}$.

Body elongate, rather oblong; Head width $2 \frac{1}{4}$ in total head length. Snout compressed, width $1 \frac{1}{5}$ its length. Eye with hind pupil edge very slightly advanced to middle of head length; adipose-eyelid covering hind third of eye. Mouth moderately inclined, lower jaw slightly protruding. Maxillary to front pupil edge; expansion $1 \frac{1}{3}$ in eye.

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Teeth conic, in single row in each jaw, though upper with row or narrow band of minute teeth; villiform teeth on vomer, palatines and tongue. Nostrils together, at last fifth in snout. Interorbital convex, elevated, median keel from above nostrils to occiput moderately convex. Rakers $7+18$, lanceolate, $1\frac{1}{4}$ in eye, filaments $\frac{7}{8}$ of rakers. Scales mostly fallen, simple, cycloid, circuli about 17 to 47; curved section of lateral line $1\frac{1}{2}$ in straight section, scute width $1\frac{2}{5}$ in eye. Fourth erect dorsal spine $2\frac{3}{5}$ in head. Soft dorsal inserted midway between front pupil edge and caudal base, first branched ray 13.5; first branched anal ray about $1\frac{2}{5}$. Pectoral reaches to seventh branched anal ray (base or eye-diameter longer than head; ventral $2\frac{2}{5}$ in head. In alcohol brownish. Fins uniform, pale brown. No locality, likely Polynesia? Figure of example by Richard, from Fiji and from Tahiti.

Caranx cheilopo. Snyder.

Goad $3\frac{1}{4}$?; D. I, VIII - I, 26; A. II - I, 23; scales $86+23$; snout $2\frac{1}{2}$ in head; eye $6\frac{1}{2}$; maxillary 3; interorbital $3\frac{1}{3}$; head width $2\frac{2}{5}$. Head with strong keel above nostrils to occiput. Snout width $1\frac{1}{3}$ its length. Eye midway in head length, with very narrow adipose-lid all around. Maxillary $\frac{4}{5}$ to eye, upper edge slips entirely below preorbital; expansion $1\frac{4}{5}$ in eye. Lower jaw slightly shorter than upper. Lips thick, coriaceous, broad. Row of rather short

obtuse universal teeth in each jaw; none on vomer; few obsolete teeth on each palatine. Nostrils small, together about last $2/5$ in snout. Interorbital convex. Scales small, mostly fallen; basal radiating striae 2 to 5; circuli fine; breast below pectoral entirely covered with small scales; lateral line arched, straight section about $1\frac{1}{2}$ its upper curved section. Dorsal spines rather weak. Soft dorsal and anal but little elevated in front and origin of former about midway between nostrils and caudal damaged. Pectoral (damaged) apparently little longer than head; ventral 2 in head; upper caudal lobe about $1\frac{1}{8}$. In alcohol brownish, paler below. Fins uniform brown. Slaty dusky blotch on upper hind opercle edge nearly half diameter of eye. Length of skinned fish 515 mm. Although without data it was likely from the Hawaiian Islands?

Caranx ferdad (Forskål). *Fig 127 and 128.*

Figure by Richard of an example from Tahiti. Painting by Drayton, gives the length of his specimen 4 ft. $2\frac{1}{2}$ inches and its weight about 50 lbs. Lebukia, Fiji, May, 1840.

Caranx speciosus (Forskål). *Fig 129.*

Drawing by Richard of Hawaiian example, likely represents this species.

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Vomer setapinnis (Mitchill).

Head $2 \frac{3}{4}$ to $2 \frac{9}{10}$; depth $1 \frac{4}{5}$ to $1 \frac{9}{10}$; D. -? I, 24; A. I, 19 or 20; snout $2 \frac{1}{6}$ to $2 \frac{1}{3}$ in head from upper jaw tip; eye $4 \frac{3}{4}$ to $4 \frac{4}{5}$; maxillary $2 \frac{1}{2}$; interorbital $5 \frac{1}{2}$ to 6; rakers $9 + 28$ to 36; length 185 to 275mm. (caudals damaged). Two, one from Peru and the larger from South America? The smaller example has very differently formed gill-rakers than any we have seen previously. They are irregular as to length and the terminal portion of each is expanded or spatulate, so that they fold one over the other. Many are also variously bent. Richard gives a drawing of a Rio Janeiro example.

We have compared a series in the Academy from Rhode Island, New Jersey, Maryland, South Carolina, various examples from the coasts of our Atlantic States, Costa Rica, Colon, Panama, Trinidad, Rio Janeiro and West Africa. These show: Head $2 \frac{1}{2}$ to $3 \frac{1}{3}$; depth $1 \frac{2}{5}$ to $2 \frac{1}{8}$; D. VI or VII - I, usually 22, frequently 21 or 23, rarely 21 or 24; A. I, 17 to 20, once 19; snout $2 \frac{1}{8}$ to $2 \frac{1}{2}$ in head from upper jaw; eye $2 \frac{1}{2}$ to 5; maxillary $2 \frac{2}{5}$ to $2 \frac{7}{8}$; interorbital 5 to 6; rakers 7 to 9, once 10 usually 28, though vary 24 to 33; length 82 to 340 mm. (31 specimens examined).

Nichols has accepted Jordan and Evermann's separation of the three forms evidently to be grouped under this species. He replaces their V. gabinensis (not of Guichenot) with a new name, V. setapinnis cubensis⁸⁷. This is based on an example 122 mm. long, with the depth 1.56. Our Costa Rica

87. Bull. Amer. Mus. Nat. Hist., vol. 38, 1918, p. 672.

(Atlantic) material shows the depth $1 \frac{2}{5}$ and they are examples 117 to 128 mm., long, this even deeper-bodied. A survey of the material at hand, therefore, does not disclose any appreciable way of separating the specimens into even tangible varieties. From his table it is interesting to note that the average of 22 dorsal rays for his Atlantic material agrees, also the 18 anal rays. Our larger example of the 2 from West Africa has 31 rakers on the lower part of the first arch, not 23 as stated by Fowle⁸⁸.

Jordan and Rutter admit V. spixii as distinct,⁸⁹ on account of its deeper body, giving the depth as $1 \frac{3}{5}$ for Jamaican specimens 125 mm. long. West Indian material in the Academy from Santo Domingo and St. Thomas, reported as V. spixii by Fowler⁹⁰, do not show sufficient characters for distinction.

⁸⁸ Proc. Acad. Nat. Sci. Phila., 1905, p. 87.

⁸⁹ L. c., 1899, p. --

⁹⁰ L. C., 1905, p. 88.

Nichols in the paper previously noted refers to Lütken's view that Alectis is the young of Hynnix, in which case Alectis has priority". In this event, however, Alectis Rafinesque though a substitute for Gallus Lacepede, which is preoccupied, leaving Alectis as valid as stated by Jordan and Evermann is misleading⁹¹. It follows that Alectis

⁹¹ Stamford Univ. Pub., 1917, p. 88.

Rafinesque therefore has the same type (monotype) as Gallus Lacepede⁹². Its ruling would be in accordance with tautonomy as the name G. virescens was apparently framed by Lacepede to avoid just such a contingency. Alectis Rafinesque therefore becomes a synonym of Selene Lacepede and Gallus Lacepede (preoccupied in ornithology) likewise falls to the same. This leaves Blepharis Cuvier as the earliest generic name for the thread-mackerels. Though preoccupied in botany it is not preoccupied in zoology, a circumstance which led Gill to propose the later Blepharichthys. Blepharis Cuvier is therefore not "a synonym of Alectis Rafinesque" as stated by Jordan and Evermann,⁹³ but the correct name for the thread-mackerels, with possibly the single species Blepharis ciliaris (Bloch). From material we have examined in the Academy it appears Scyris Cuvier is apparently a valid genus, as we have studied both S. alexandrina (St. Hilaire) and S. indica Rüppell.

⁹² Hist. Nat. Poiss., vol. 4, 1802, p. 583. Type Gallus virescens Lacepede (monotypic) Zeus gallus Linnaeus.

⁹³ Stanford Univ. Pub., 1917, pp. 105, 129.

Selene vomer (Linnaeus).

One from Rio Janeiro 163 mm., long (caudal damaged).

Chloroscombrus chrysurus (Linnaeus). *Fig. 132.*

Two from Rio Janeiro. They show the depth $2\frac{1}{4}$ to $2\frac{2}{5}$ and length 138 to 143 mm. (both caudals damaged).

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with silvery. Fins and iris all brownish, without markings. Length 93 to 150 mm. One without locality and another from Samoa?

The drawing by Richard is also based on a Samoan example. We also include an example in the Academy from Sumatra.

When fresh in ~~arrect~~ the Sumatran example was pale slaty with silvery tinge above, and lower surface silvery-white. Fins more or less dusky and front lobes of soft dorsal and small blackish. Pectoral dusky basally and medially.

Trachinotus quadripunctatus (Rüppell). *Fig. 133.*

Head $3 \frac{2}{5}$; depth $1 \frac{9}{10}$; D. I, VII, 19; A. III, 18; snout 4 in head; eye 4; maxillary $2 \frac{3}{4}$; interorbital 3.

Body elongately ovoid, deepest at dorsal origin, strongly compressed. Head width half its length. Snout obtuse, surface convex, length $\frac{2}{3}$ its width. Eye rounded, hind edge midway in head length, with narrow adipose-eyelid all around. Mouth moderately small, closed lower jaw included. Maxillary nearly to eye center; expanse $2 \frac{1}{3}$ in eye. Bands of villiform teeth in jaws, on vomer, palatines and tongue. Interorbital elevated convexly and median keel to occiput. Rakers 7+10, vi, lanceolate, about 2 in filaments which $1 \frac{1}{4}$ in eye. Scales rather elongate, very small; basal radiating striae 3 to 11; largest scales on hind half of trunk and caudal peduncle, minute on predorsal and breast; patch of scales close behind eye in 3 or 4 rows only ones on head; lateral line slightly waved medially. Soft dorsal inserted slightly nearer caudal

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base than preopercle ridge, long front lobe extends beyond caudal base, equals body depth; front and anal lobe $1\frac{1}{4}$; upper caudal lobe about $1\frac{1}{4}$. Pectoral $1\frac{1}{3}$ in head; ventral $2\frac{1}{5}$. In alcohol dull brownish generally, sides and lower surface burnished silvery-white. Fins all brown. Iris light brown. Along lateral line on each side of body. 3 obscure deep brown spots, little smaller than pupil, first opposite dorsal origin and third nearly opposite front of caudal peduncle. Length 330 mm., one without locality, likely from Polynesia?

Richard's drawing is much smaller and is based on a specimen from Pomotri~~va~~.

Ruppell's figure of Casimorus quinquipunctatus⁹⁴ agrees in the essential characters, such as the maxillary to middle

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Atlas Reis.Nord.Af., 18 , p. 90, Pl. 24, fig. 1.

of eye, long dorsal and anal and caudal lobes, that of the anal longer than the dorsal and reaching back opposite caudal base. He also shows indications of a few postocular scales directly behind the eye. The species of the present group in Polynesia are discussed by Kendall and Goldsborough⁹⁵.

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Mem. Mus. Camp. Zool., 1911, pp. 269 to 271.

Trachinotus falcatus (Linnaeus). *Fig. 134.*

Drawing by Richard, labeled Rio Janeiro.

Trachinotus ovatus (Linnaeus). *Fag-135.*

Head $3 \frac{1}{8}$ to $3 \frac{2}{5}$; depth $1 \frac{2}{3}$ to $1 \frac{3}{4}$; D.I, VI, 18 or 19; A. III, 17; snout 4 to $4 \frac{1}{8}$ in head; eye $3 \frac{1}{2}$ to 4; maxillary 3 to $3 \frac{1}{8}$; interorbital $2 \frac{1}{3}$ to $2 \frac{4}{5}$.

Body deeply ovoid, deepest at dorsal origin, strongly compressed. Head width $1 \frac{7}{8}$ to 2 in its length. Snout obtuse, front profile nearly or quite vertical, length $\frac{2}{3}$ its width. Hind eye edge about midway in head length, narrow free adipose-lid all around. Mouth small, lower jaw included. Maxillary little beyond front eye edge, to pupil in young; expansion about 2 in eye. Fine villiform teeth in bands in jaws in young, disappearing with age, when jaw edges leather-y. Interorbital convexly elevated. Rakers 4 or 5 + 9 or 10, lanceolate, about half of filaments, which $1 \frac{1}{3}$ in eye. Scales finely adherent, simple, elongate, non-striate; circuli about 12 or 13; lateral line slightly more undulate with age. Dorsal origin about midway between preopercle ridge and caudal base, slightly advanced in young; front dorsal lobe about 2 in depth; front anal lobe $2 \frac{1}{6}$ to $2 \frac{1}{4}$, caudal fin $1 \frac{3}{5}$ to 2; pectoral $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in head; ventral $1 \frac{7}{8}$ to $2 \frac{1}{2}$. In alcohol

brownish, sides and below burnished. *The drawing by Richard of an example from Vamoa, 125 mm. long.*
Trachinotus carolinus (Linnaeus) *Fag-135a.*

Two from Rio Janeiro 20 or 21 mm. long. We have compared this with equally young material in the Academy from New Jersey and find they agree. The smaller Brazilian specimens show 22

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or 23 soft rays and 20 to 22 soft anal rays.

Trachinotus ^opalma Jordan and Starks. Fig. 135-b.

Small example 25 mm., from Valparaiso.

Lactarius lactarius (Schneider).

Head $2 \frac{3}{4}$, depth $2 \frac{2}{3}$, D. VII - I, 22; A. III, 27; scales 75 in lateral line to caudal base and 6 more in latter; 9 scales above lateral line to soft dorsal origin, 20 below to spinous anal; about 23 scales between supracapula and spinous dorsal origin; snout 4 in head from upper jaw tip; eye $4 \frac{1}{5}$; maxillary $2 \frac{1}{10}$; interorbital 4.

Body strongly compressed, rather ovoid in contour or little deeper forward; caudal peduncle well compressed, length about $\frac{7}{8}$ least depth and latter 3 in total head. Head width $2 \frac{1}{4}$ in its length. Snout conic, upper profile straight, length $1 \frac{4}{5}$ its width. Hind eye edge midway in head length, with very narrow adipose lid all around. Mouth large, powerful, lower jaw well protruded. Lips moderate. Maxillary to eye center, free terminally; expansion $1 \frac{1}{2}$ in eye. Band of minute, fine, simple, conic teeth above, narrowing toward rictus; pair of strong canines in front; row of small, simple, conic, close-set, uniform teeth along each side of lower jaw, though larger than lateral upper teeth; pair of close-set canines in front, left one double; bands of minute teeth in vomer and palatines. Tongue smooth, pointed, free in front. Nostrils together, level with upper

eye edge, also close before its front edge. Interorbital convexly elevated and distinct median occipital keel behind. Rakers 3+13, ii, strong, lanceolate, about $1 \frac{7}{8}$ in eye; filaments $\frac{4}{5}$ of rakers. Scales moderate, adherent, simple, cycloid; apical circuli about 52 to 60; all fins, at least basally, covered with minute scales; lateral line conspicuous, follows parallel with dorsal profile from shoulder to caudal base medially; tubes large, simple, well exposed. Spinous dorsal origin slightly nearer mandible tip than last dorsal ray base, second spine longest or about $2 \frac{1}{3}$ in head. Soft dorsal inserted slightly nearer caudal base than eye, first branched ray $2 \frac{2}{5}$ in head. A Anal origin about midway between snout tip and caudal base, first branched ray $2 \frac{2}{5}$ in head; caudal (slightly damaged) $1 \frac{1}{4}$, fin forked; pectoral $1 \frac{1}{8}$; ventral $2 \frac{2}{3}$.

Color in alcohol back brown. Sides and below paler or tinted silvery. Fins and iris pale brown. Length 173 mm. (caudal damaged). Colombo.

Leiognathidae

Leiognathus splendens (Cuvier).

Head 3 to $3 \frac{1}{8}$; depth $1 \frac{3}{5}$ to $1 \frac{3}{4}$; D. VIII, 15 or 16; A. III, 14 or 15; tubes in lateral line 50 to 55 to caudal base; snout $2 \frac{1}{5}$ to $3 \frac{1}{3}$ in head; eye $2 \frac{4}{5}$ to $3 \frac{1}{5}$; maxillary $2 \frac{1}{8}$ to 3; interorbital $2 \frac{3}{5}$ to $3 \frac{1}{4}$.

Body deeply rhomboid; upper profile with bulge more advanced. Head width $1 \frac{3}{4}$ to $1 \frac{4}{5}$ its length. Snout convex, length $\frac{4}{5}$ to $\frac{7}{8}$ its width. Eye elevated, hind pupil edge about midway in head length. Mouth slightly inferior, horizontal, jaws even. Teeth fine, simple, even, in single brush-like band in each jaw. Maxillary nearly vertical, to or slightly beyond front of eye, not to pupil; groove extends down vertically below. Nostrils together, hind one twice front one, close before upper eye front. Parietal ridges widely separated, entire, approximate behind where median supraoccipital extends back on its process half way to spinous dorsal; interorbital widely concave between parietal ridges; above and before eyes 2 low spines each side, sometimes one or both bifid; supraocular ridge with row of very small fine serrae; lower preopercle edge finely serrate, hind edge entire. Rakers 6-18, lanceolate, about long as filaments, which are not quite half of eye. Shoulder-girdle inside gill-opening with 2 wide-set broad bony knobs. Scales caduceous, extend on chest and breast, nostriate; apical vertical circuli 20 to 60 and basal convex circuli 16 to 45 (higher figures

for both adults); scaly axillary ventral flap slightly shorter than spine; lateral line moderately arched, tubes simple. Second dorsal spine $1\frac{1}{2}$ to $1\frac{3}{5}$ in head; second anal spine $1\frac{1}{2}$ to $1\frac{2}{3}$; pectoral $1\frac{1}{6}$ to $1\frac{1}{3}$; ventral $2\frac{1}{8}$ to $2\frac{1}{3}$. In alcohol dull brownish with silvery-white tints below. Fins and iris pale. Length 80 to 125 mm. Three examples from Manila, and Fiji.

We have also included examples in the Academy from the Philippines and Sumatra. The latter, when fresh in arrack, were pale gray above and lower half of body white, washed everywhere more or less with bright silvery. Snouth brownish. Gill-opening inside dusted brown. Iris pale orange. Peritoneum silvery. Fins pale brownish-yellow, more bright yellow on lower fins. Pectoral axil grayish with darker tints. Upper half of spinous dorsal membranes, after second spine, black.

Leiognathus equula (Forsk.)

Head 3; depth $1\frac{4}{5}$; D. VIII, 16; A. III, 14; tubes in lateral line 54 to 58 to caudal base; snout $2\frac{1}{2}$ to $2\frac{2}{3}$ in head; eye $2\frac{3}{4}$ to 3; maxillary $2\frac{1}{5}$ to $2\frac{1}{2}$; interorbital $2\frac{2}{3}$ to $3\frac{1}{5}$.

Body deeply rhomboid as in preceding species. Head width half its length. Snout convex, length $\frac{3}{4}$ its width. Eye elevated, center about midway in head length. Mouth slightly inferior, horizontal lower jaw little shorter. Teeth like in preceding species. Maxillary steeply inclined about to eye, in young very slightly beyond its front edge; groove down below to its end. Nostrils, in-

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terorbital and ridges on head like preceding species. Supra-nasal spines 2 each side, simple. Rakers 2+20, lanceolate, much less than filaments, which about half of eye. Shoulder-girdle inside gill-opening with 2 pointed and rather high bony knobs. Scales very caducous or all lost, minute; breast and chest naked; axillary ventral flap but little less than spine; lateral line moderately arched. Second dorsal spine $1 \frac{2}{3}$ to $1 \frac{7}{8}$; pectoral $1 \frac{1}{3}$ to $1 \frac{2}{5}$, ventral 2 to $2 \frac{1}{6}$. In alcohol faded dull brown above, silvery white below. Fins all pale brown. Length 60 to 85 mm. Two labeled from "Rio Janeiro", certainly erroneously as they more likely may have been secured in the Philippines?

Besides the above we also include a Sumatran example in the Academy. When received fresh in arrack it was pale slaty on back and head above. Lower half of body white. Traces of indistinct narrow darker vertical stripes on side of back. More or less silvery reflections everywhere. Fins pale or dilute brown. Upper part of spinous dorsal dusky, and caudal tinted slightly with same on outer portions. Pectoral axil with pale dusky dots. Snout brown. Iris pale orange.

Leiognathus blochii (Valenciennes).

Head 3 to $3 \frac{1}{8}$; depth $2 \frac{1}{4}$; D. VIII, 16; A. III, 15; snout $3 \frac{1}{6}$ in head; eye 3 to $3 \frac{1}{5}$; maxillary $2 \frac{1}{5}$; interorbital $2 \frac{7}{8}$ to 3.

Body elongately ovoid. Head width about half its length. Snout rather conic, long as wide. Eye elevated, center about

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midway in head length. Mouth and teeth as in L. equula. Maxillary oblique, reaches beyond from eye edge, but not to pupil; groove from below expansion. Nostrils, interorbital and ridges in head as in L. equula. Supra-orbital ridge entire. Supra-nasal spines 2 each side, simple. Lower preopercle edge rather coarsely serrate, hind edge entire. Supraorbital entire. Rakers 5+18, about equal filaments, which about half of eye. Shoulder-girdle knobs and ventral axillary flap as in L. equula. No scales on breast, chest or predorsal region. Second dorsal spine $1\frac{3}{4}$ to 2 in head; second anal spine $1\frac{3}{4}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $2\frac{1}{4}$ to $2\frac{1}{2}$. In alcohol back slaty-gray till level with eye, side and below silvery-white. Fins all pale, uniform. Length 48 to 57 mm. Two examples labeled "Rio Janeiro", certainly erroneous, and likely from the Philippines?

These examples appear to approach closer to Equula blochii as described and figured by Day¹⁰³. It differs, however, in 14 anal rays; "upper surface of orbit serrated, which serrations appear to become obsolete in some old specimens"; and "ventral reaches to anal", but the figure would show it if depressed only about $\frac{2}{3}$ the distance. Our examples have the apical portions of highest spinous dorsal membranes damaged, though what remains above shows traces of dark pigment spots, so that this region may have been dusky. There is only a very faint suggestion of a dark or nuchal saddle, though the pectoral axilla is quite dark. L. blockii appears to be confined to the Indian region.

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Secutor insidiator (Bloch).

Head $3/8$ to $3\frac{1}{2}$; depth $2\frac{1}{8}$ to $2\frac{3}{5}$; D. VIII, 16 or 17; A. III, 14; snout 2 to $3\frac{1}{2}$ in head from upper jaw tip; eye $2\frac{3}{4}$ to $3\frac{1}{6}$; maxillary $2\frac{1}{8}$; interorbital $3\frac{2}{5}$ to 4; rakers 8+19, lanceolate, about equal filaments or 12.3 in eye, length 40 to 97 mm. Five from Manila.

This species differs from the following chiefly in its more elongate body. The color in alcohol is leaden-gray, on back with darker or slaty vertical streaks, bars or blotches. In young markings fewer and larger. Sides below level of eye silvery-white, also iris. Fins all plain or pale brownish.

Secutor ruconius (Buchanan-Hamilton).

Head 3 to $3\frac{1}{5}$; depth $1\frac{3}{4}$; D. VIII, 1, 16; A. III, 14; snout 3 to $3\frac{3}{5}$ in head from upper jaw tip; eye $2\frac{1}{4}$ to $2\frac{1}{2}$; maxillary 3; interorbital $2\frac{1}{3}$ to 3.

Body deeply though unevenly ovoid, lower profile more bulged forward; belly sharply trenchant before anal. Head width 2 to $2\frac{1}{8}$ its length. Snout blunt, about wide as long. Eye center about midway in head. Mouth small, horizontally protractile, profile slightly inclined forward. Maxillary vertical, not reaching eye. Minute teeth even, uniserial. Nostrils together; hind one vertical slit, twice size of first one, in part or slightly over eye. Interorbital elevated convexly, with entire parietal ridges, approximated behind and

median supra-occipital ridge; last minutely serrated; single infranasal spine each side; lower preopercle edge serrate, serrae gradually larger forward and hind edge entire. Rakers 5 15, lanceolate, long as filaments or about half of eye. Shoulder-girdle inside gill-opening with upper knob greatly longer than lower. Scales all fallen, very small; breast naked.

Third dorsal spine $1\frac{2}{3}$ in head; second anal spine $2\frac{1}{5}$ to $2\frac{1}{2}$. In alcohol pale slaty-brown to leaden, with 7 or more darker vertical streaks. Lower half of body white, everywhere more or less silvery. Upper half of spinous dorsal blackish. Other fins dilute yellowish-brown in fresh example. Lower fins pale. Eye silvery, also perithoneum. Length 36 mm. Two from Singapore. We also include a Sumatran example 35 mm. long in the Academy.

CHEILODIPTERIDAE.

Amia frenata (Valenciennes).

Head $2\frac{2}{5}$ to $2\frac{2}{3}$; depth $2\frac{2}{3}$ to 3; D. VII - I, 9, 1; A. II, 8 or 9, 1; scales 24 to 28 in lateral line to caudal base and 4 more on latter; 2 or 3 scales above lateral line to spinous dorsal origin, 6 or 7 below; predorsal scales 5; snout $3\frac{2}{5}$ to $3\frac{2}{3}$ in head from upper jaw tip; eye 3 to $3\frac{1}{3}$; maxillary jaw tip; eye 3 to $3\frac{1}{3}$; maxillary $1\frac{4}{5}$ to $2\frac{1}{6}$; interorbital $3\frac{3}{4}$ to $4\frac{1}{4}$.

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Body robust, stout, compressed. Head width 2 to $2\frac{1}{5}$ in its total length. Snout convex, length $\frac{3}{4}$ its width. Eye impinging on upper profile, hind pupil edge slightly advanced from middle in head length. Jaws nearly even or lower only very slightly advanced. Maxillary to hind pupil edge, to eye center in young; expansion $2\frac{1}{4}$ to $2\frac{3}{4}$ in eye. Bands of villiform teeth in jaws and on vomer, none on palatines or tongue. Interorbital convex. Preopercle edge and ridge, also infraorbital edge, finely, though rather unevenly, serrate. Rakers II, 2 to 4 8 vi, or 17, lanceolate, about 2 in eye; filaments $\frac{2}{3}$ of rakers. Scales large, adherent; basal striae 14 to 19; apical serrae very fine, about 100 to 122; circuli moderate; 2 rows of scales on cheek; each tube in lateral line, simple, crenulated area above and below medianly on scale. Suprascapula entire. Third dorsal spine $1\frac{7}{8}$ to 2 in head; first dorsal ray $1\frac{4}{5}$ to $1\frac{7}{8}$; second anal spine 3 to $3\frac{3}{5}$; caudal $1\frac{4}{5}$; pectoral $1\frac{3}{5}$ to $1\frac{7}{8}$; ventral $1\frac{3}{4}$ to $2\frac{1}{8}$.

Color in alcohol olive-brown. Obsolete dusky band from snout tip to upper caudal lobe base, where ending in large blackish blotch. Lower surface little paler. Spinous dorsal largely blackish, pale basally and soft dorsal similar. Caudal mostly pale, somewhat dusky basally. Other fins all pale. Soft dorsal and anal each with dusky bar along its base to spinous dorsal, with dusky streak from

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base to fin edge including first two rays. Iris dull brown. Length 115 to 150 mm. One from Oahu and another labeled "Oahu or Fiji". We also include 3 in the Academy from Honolulu.

In some smaller examples basal dark bar on soft dorsal little distinct and fin more or less mottled with dusky. Only in largest example is basal soft dorsal dusky band distinct and without mottlings. Upon comparison with the types of Apogon evanidus Fowler¹⁰⁴ the latter appears to be the young. The caudal spot is hardly evident and apparently somewhat faded, though the median dark lateral band is quite distinct. In the smaller example the preopercle ridge is entire, while in the larger it has a few jagged points at its corner. In both, however, the preopercle edge is denticulated completely. The scales show basal striae 11 to 13, apical denticles 78 to 90, and circuli all basal and rather coarse, these doubtless age characters.

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Journ. Acad. Nat. Sci., Phila., (2) vol. 12, 1904, p. 518.
Padang, Sumatra.

Amia savayensis (Günther)

Head $2 \frac{2}{5}$; depth 3?; D. VII - I, 8 or 9; A. II, 8 or 9; scales 22 (damaged) in lateral line to caudal base and 3 more out on latter; 2 scales above lateral line to spinous dorsal origin and 7 below to spinous anal origin;

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6 predorsal scales; snout $4\frac{1}{4}$ in head from upper jaw tip; eye $2\frac{1}{5}$; maxillary 2; interorbital 4. Length 54 to 75 mm. One from Samoa and 2 from Fiji. One also labeled "Fiji or Oahu" and another "Fiji or Samoa". Although in very poor condition all these examples show traces of very pale dark streak across cheek to corner of preopercle.

Amia maculifera (Garrett).

Head $2\frac{2}{5}$ to $2\frac{1}{2}$; depth $2\frac{1}{2}$ to $2\frac{7}{8}$; D. VII - I, 9, 1; A. II, 8, I; scales 24 in lateral line to caudal base and 2 or 3 more on latter; 2 or 3 scales above lateral line to spinous dorsal origin, 6 or 7 below; predorsal scales 5; snout 4 to $4\frac{1}{5}$ in head; eye 3 to $3\frac{1}{4}$; maxillary 2 to $2\frac{1}{8}$; interorbital $4\frac{2}{5}$ to 5.

Body ovate, well compressed. Head width $2\frac{1}{8}$ in its length. Snout convex, length $\frac{3}{4}$ to $\frac{4}{5}$ its width. Eye impinging on upper profile, hind pupil edge slightly advanced before middle in head length. Jaws about even or mandible very slightly protruding with slight symphyseal tubercle. Maxillary to hind pupil edge, about midway in eye in young; expansion 2 in eye. Bands of villiform teeth in jaws, few in vomer, none on palatines or tongue. Interorbital flattened. Preopercle edge with fine serrae its whole length, ridge entire. Rakers ~~5~~ 16 or 17, lanceolate, about $2\frac{1}{4}$ in eye; filaments $\frac{2}{3}$ of rakers. Scales large, adherent, basal radiating striae 9 or 10; apical serrae 95 to 98; circuli moderate; 2 rows of scales on cheek

Suprascapula serrate, entire in young. Third dorsal spine 2 to $2 \frac{1}{6}$ in head; second dorsal ray $1 \frac{1}{2}$ to $1 \frac{3}{5}$; second anal spine $2 \frac{1}{3}$ to $2 \frac{4}{5}$; first anal ray $1 \frac{3}{5}$ to 2; caudal $1 \frac{2}{5}$ to $1 \frac{3}{5}$; pectoral $1 \frac{3}{5}$ to $1 \frac{3}{4}$; ventral $1 \frac{2}{3}$ to $1 \frac{7}{8}$.

Color in alcohol faded olive-brown, paler or somewhat silvered below and on opercle. Iris silvered. Each scale with brownish spot, smaller than pupil, forms lengthwise series, except abdomen and breast. Distinct brownish spot at caudal base. Fins all pale. Length 70 to 123 mm. Three from Oahu, and 2 labeled "Fiji or Oahu". We also include 2 Hawaiian examples in the Academy obtained by Dr. J. K. Townsend.

Amia novemfasciata (Cuvier).

Head $2 \frac{3}{5}$ to $2 \frac{3}{4}$; depth $2 \frac{3}{5}$? to $2 \frac{3}{4}$; D. VII - I, 8, 1, or 9, 1; A. II, 8, 1; scales 22 to 24 in lateral line to caudal base and 3 more on latter; 2 scales above lateral line to spinous dorsal origin, 7 below; 4 or 5 predorsal scales; snout 4 to $4 \frac{1}{3}$ in head from upper jaw tip; eye $2 \frac{7}{8}$ to 3; maxillary $1 \frac{7}{8}$ to 2; interorbital $4 \frac{1}{3}$ to $4 \frac{1}{2}$.

Body elongately ovoid, well compressed. Head width 2 to $2 \frac{1}{3}$ its length. Snout convex, length $\frac{2}{3}$ its width. Eye large, elevated, impinging slightly on upper profile, hind pupil edge slightly advanced, about midway in head length in smaller examples. Jaws nearly equal or lower

but slightly protrudes. Maxillary nearly to hind pupil edge, to eye center in young; expansion 2 to $2 \frac{2}{5}$ in eye. Bands of villiform teeth in jaws, on vomer and palatines, none on tongue. Interorbital flattened. Preopercle edge entirely finely serrate, ridge entire. Rakers III, 3 to 9 to 11, about 3 in eye, much longer than filaments. Scales adherent; basal radiating striae 10; apical denticles 62 to 67; circuli moderate; 2 rows of scales on cheek. Suprascapula entire. Third dorsal spine $1 \frac{3}{4}$ in total head length; second dorsal ray $1 \frac{1}{3}$; second anal spine $2 \frac{1}{3}$ to $2 \frac{7}{8}$; first anal ray $1 \frac{2}{3}$; caudal $1 \frac{3}{5}$; pectoral $1 \frac{2}{5}$ to $1 \frac{4}{5}$; ventral $1 \frac{3}{5}$ to $1 \frac{2}{3}$. Length 48 to 77 mm. (caudal damaged). One from the Philippines and one from Fiji. Also two labeled a Sumatran example in the Academy with the above.

The last, when fresh in alcohol mostly uniform pale brown, head, somewhat dusky. Meridian lengthwise blackish-brown band from snout to caudal and extended out on median caudal rays. Above and parallel similar band from upper side of head along back in caudal, then curves down slightly, but not to fin edge. Still another similar band from below eye along side to lower part of caudal where slightly curved up. Broad blackish band along soft dorsal basally and out on last rays. Similar band along anal base. Upper and lower caudal edges narrowly blackish. Fins mostly dilute grayish. ~~Blackish-brown band~~ Blackish-brown band along lower side of anal base. Peritoneum silvery.

Minorus graeffei (Günther).

Head $2\frac{1}{2}$; depth $2\frac{1}{6}$; D. VI - I, 9; A, II, 9; scales above lateral line to spinous dorsal origin, 6 below to spinous anal origin; 5 predorsal scales; snout 5 in head from upper jaw tip; eye $2\frac{1}{4}$; maxillary 2; interorbital $3\frac{1}{2}$.

Body generally ellipsoid, well compressed. Head width $2\frac{1}{6}$ its total length. Snout convex, length half its width. Eye not impinging on upper profile, hind pupil edge about midway between snout tip and hind opercle edge. Lower jaw slightly protrudes. Maxillary to first $2/5$ in edge; expansion $2\frac{1}{2}$. Bands of villiform teeth in jaws, on vomer and palatines, none on tongue. Interorbital slightly convex. Preopercle ridge and hind edge entire. Rakers $8+20$, finely lanceolate, $2\frac{1}{2}$ in eye, and twice long as filaments. Scales adherent, basal striae 7 or 8; radiating apical denticles 33 to 44; basal circuli much coarser and more regular than apical; cheek with 2 rows of scales; each tube of lateral line simple, extends over scale exposure to its hind edge. Suprascapula entire. Third dorsal spine nearly long as head from snout tip; second anal spine $2\frac{2}{5}$ in total head length. In alcohol largely uniform dull brownish. Length 40? mm. (caudal damaged) Fiji.

Jordan and Seale emphasize as a generic character for Mionorus Krefft that "the two limbs of the preopercle both strictly entire". There are, however, a few irregularities

or uneven inconspicuous serrae along the entire lower edge of the preopercle in our example. Their figure shows a much larger second dorsal spine than our example (end now broken) ever appears to have had. They but faintly show¹⁰⁵ the scales on the predorsal and breast, though in our example they are quite large. Gunther's figure¹⁰⁶ would convey the impression that the lower and lower hind preopercle edges are slightly roughened or obscurely serrate.

¹⁰⁵ Bull. Bur. Fisher. U.S., 1905 (1906), p. 247, fig. 41.

¹⁰⁶ Journ. Mus. Godeffroy, vol. I, 1873, Pl. 20, fig. E.

Fowleria variegatus (Valenciennes).

Head $2 \frac{1}{3}$ to $2 \frac{2}{5}$; depth $2 \frac{3}{5}$ to $2 \frac{3}{4}$; D. VII - I, 8, or 9, 1; A. II, 8; scales 22 in lateral line to caudal base; 2 scales above lateral line; 6 below; 6 predorsal scales; snout $4 \frac{2}{3}$ to $4 \frac{3}{4}$ in head from upper jaw tip; eye $3 \frac{1}{3}$ to 4; maxillary $1 \frac{3}{4}$ to $1 \frac{9}{10}$; interorbital $6 \frac{1}{2}$.

Body elongately ellipsoid, compressed. Head width $2 \frac{2}{5}$ to $2 \frac{1}{2}$ its total length. Snout convex, length $\frac{2}{3}$ its width. Eye slightly impinging on upper profile, which little concave or depressed at this point; hind eye edge about midway in head. Lower jaw slightly protrudes. Maxillary reaches beyond hind pupil edge, though not quite to hind eye edge; expansion $1 \frac{3}{4}$ to $1 \frac{4}{5}$ in eye. Bands of minute villiform teeth in jaws and on vomer, also band along each side of tongue longitudinally.

Interorbital slightly concave. Preopercle edge and ridge entire. Rakers II, 1+5, vii, rather clavate, about $2/3$ of filaments or $3\frac{1}{2}$ in eye. Scales large, rather caducous; basal striae 15 to 20; apical serrae 95 to 130; circuli moderate basally, none apical; 3 rows of scales on cheek; tubes in lateral line simple, nearly to hind edge of scale. Third dorsal spine 2 to $2\frac{2}{5}$ in head; spine of second dorsal fin 3 to $3\frac{1}{4}$; second anal spine $2\frac{3}{4}$ to 3; caudal $1\frac{1}{4}$ to $1\frac{2}{3}$; pectoral $1\frac{3}{5}$ to $1\frac{4}{5}$; ventral 1 3.5 to $1\frac{3}{4}$. In alcohol dark brownish, obscurely mottled darker. Each scale on caudal peduncle and on costal region with dark or dusky median blotch. Black ocellus on opercle nearly large as eye. Dorsals anals and caudal brown, like body-color, with obscure darker dusky specks or small blotches. Length 58 to 74 mm. Two examples, labeled "Fiji or Oahu", though it is quite unlikely that they were obtained in Hawaii.

Jordan and Seale admit 3 Polynesian species of Apogonichthys¹⁰⁷. About the only characters they give are those of color. A. marmoratus Alleyne and Macleary is said to be cross-barred and A. isostigma Jordan and Seale is described with a distinct black spot at the base of many scales, forming lines. Our examples, though long and poorly preserved, show traces of such spots and also the lower side of the head with obscure darker blotches or markings.

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Bull. Bur. Fishes, U.S., vol. 25, 1905 (1906), p. 250.

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They agree with two smaller Samoan examples in the Academy, although the latter seem to show a slightly more mottled appearance, fins more cross-barred and smaller with conspicuous dark vertical bands. Scales with basal radii 17 or 18; apical denticles 70 to 72.

Ambassidae.

Ambassis ambassis (Lacépède).

Head $2 \frac{4}{5}$; depth $2 \frac{3}{4}$; D. VII, I, 10; A. III, 9, 1; scales 24 in lateral line to caudal base and 3 more on latter; 3 scales above lateral line to spinous dorsal origin; 7 below to anal origin; 14 predorsal scales to eyes; snout $4 \frac{1}{2}$ in head from upper jaw tip; eye 3; maxillary $2 \frac{2}{3}$; interorbital $3 \frac{2}{5}$.

Body elongately ovoid, strongly compressed; predorsal keel trenchant to eyes. Head width $2 \frac{2}{3}$ in its total length. Snout convex, length $\frac{3}{5}$ its width. Hind eye edge midway in head without mandible. Maxillary extends little beyond front eye, but not to pupil. Lower jaw well protruded in front. Narrow bands of minute or villiform teeth in jaws, on vomer and palatines; no teeth on tongue. Interorbital slightly convex. Lower preopercle ridge also lower edge of bone, finely denticulated, otherwise entire; lower preorbital edge denticulated; lower interopercle edge with 4 denticles, last at corner and largest. Rakers 8 17, lanceolate, about 2 in eye; filaments about $\frac{3}{5}$ of rakers. Scales rather loose; many fallen; basal radii about 5 to 8; apical circuli 38 to 53; basal circuli much coarser or 35 to 40; though squamation damaged lateral line complete

below soft dorsal. Second dorsal spine $1 \frac{1}{5}$ in head; spine of soft dorsal $1 \frac{3}{4}$; third anal spine $1 \frac{3}{4}$; pectoral $1 \frac{1}{6}$; ventral $1 \frac{1}{4}$. In alcohol faded largely dull brown, with silvery reflections on head, breast and along side as median streak. Fins pale uniform brown. Iris brownish-white. Length 68 mm. Fiji.

Comparison with Philippine examples in the Academy of equal size shows them in agreement, especially the serrate lower edge of interpercle, though as these are recent specimens the serrae are usually concealed by scales and may therefore be easily overlooked.

Ambassis nalu (Buchanan-Hamilton).

Head $2 \frac{2}{3}$; depth $2 \frac{1}{6}$; D. VII, I, 10, 1; A. III, 9, 1; scales (damaged) about 26? in lateral line to caudal base; scales (pockets) about 13 on predorsal; snout 5 in head from upper jaw tip; eye 3; maxillary $2 \frac{1}{8}$; interorbital $3 \frac{3}{5}$.

Body rather deeply ovoid, strongly compressed; predorsal keel trenchant to eyes. Head width $2 \frac{1}{8}$ in its length. Snout convex, length half its width. Hind eye edge midway in head, measured from snout tip. Maxillary reaches pupil, expansion half of eye. Lower jaw well protruding. Narrow bands of minute simple teeth in jaw, apparently absent from vomer and palatines and tongue. Interorbital slightly convex. Upper half of preopercle edge and vertical ridge entire; rest serrate, also lower preorbital edge. Rakers $8+17$, lanceolate,

about twice length of filaments or $1 \frac{7}{8}$ in eye. Scales loose, mostly fallen; basal radii 6; apical circuli 56 to 67; basal circuli 44 to 50. Second dorsal spine $1 \frac{1}{4}$ in head; spine of soft dorsal 2; third anal spine $1 \frac{3}{4}$; pectoral dorsal 2; third anal spine $1 \frac{3}{4}$; pectoral $1 \frac{1}{4}$; ventral $1 \frac{1}{2}$. In alcohol largely dull uniform brown, with pale silvery reflections. Fins all pale. Length 85 (caudal damaged). One labeled "Fiji or Oahu", doubtless erroneous, and may have been secured in the Philippines?

Although we have not material for comparison our example appears to be the Chanda nalua of Buchanan-Hamilton. It agrees very well with Day's account¹⁰⁸ and shows the lower interopercle edge with 5 or 6 serrae.

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Fishes of India, pt. 1, 1875, p. 53, Pl. 15, fig. 4.

Ambassis vaivasensis Jordan and Seale.

Head $2 \frac{3}{4}$; depth $2 \frac{2}{3}$; D. VII, I, 9; A. III, 9, 1; 14 pectoral (pockets) scales to eyes; snout $4 \frac{1}{5}$ in head from upper jaw tip; eye $3 \frac{1}{8}$; maxillary $2 \frac{1}{4}$; interorbital $3 \frac{1}{2}$. Body and other characters as in A. ambassis, except the following. Head width $2 \frac{1}{3}$ its total length. Interopercle ends at angle in spine, though edges entire. Scales with basal radii 4 to 9, apical circuli 34 to 71 and basal circuli 32 to 53. Second dorsal spine $1 \frac{1}{4}$ in head; third anal spine 2; pectoral $1 \frac{1}{5}$;

ventral $1 \frac{1}{3}$. In alcohol dark brown, without other markings than faded silvery reflections. Fins brown. Length 68 mm. (caudal damaged). One labeled "Fiji or Oahu", likely from the former.

Comparison with 4 paratypes in the Academy, from Samoa, 81 to 89 mm. long, shows several variations. All have at least 10 developed branched rays, and usually 9 in the soft dorsal, only one specimen with 10. The membrane between the second and third dorsal spines of the Samoan specimens is dusky; their rakers $9+17$; scales about 24 and their basal radii 5 to 9. Four examples identified by Evermann and Seale, from the Philippines, as A. urotaenia Bleeker¹⁰⁹, certainly agree better with the above examples. They have 9 branched dorsal rays; 10 branched anal rays; lateral line complete; rakers $7+16$; scales 27 or 28 to caudal base and 3 more on latter. Now Bleeker's figures and descriptions would permit a greater variation¹¹⁰. In his first figure (2) he shows the hind preopercle edge serrate. He also arranges A. urotaenia with A. wolffi, in its fewer predorsal scales (7 to 9), while the Philippine examples before us, with 14 or 15, predorsal scales, would all readily fall with the other group, or those he segregates with 11 to 14 scales. Both his figures show a smaller number of predorsal scales.

¹⁰⁹

Bull. Bur. Fisher. U.S., no 25, 1906 (1907), p. 75.

¹¹⁰

Atlas Ich. Ind. Neerl., vol. 8, 1876, pp. 133, 135, Pl. 66, fig. 2, Pl. 73, fig. 1

His text gives the anal with 9 or 10 soft rays though his figure shows but 8 and the lateral line is also interrupted below the soft dorsal. His next figure agrees with the entire hind edge and ridge of preopercle, but he shows the lateral line distinctly interrupted below the soft dorsal. This represents a fish with 9 soft anal rays. The Samoan and Philippine examples in the Academy all have the interopercle entire, except the blunt spine at the angle behind. Kendall and Goldsborough record A. urotaenia from Kusaie, Ponapi and Suva¹¹¹.

Comparison with 16 Samoan paratypes of A. lafa Jordan and Seale, in the Academy, 35 to 37 mm. long, show 3 with but 11 branched anal rays, the others with 10 and they include the smaller examples. As Jordan and Seale give 11 it would appear that 10 is more likely. It shows rakers 11 23; scales about 30, with 12 or 13 basal striae. In the young the dorsal spines are much longer, and depress backward at least $3/4$ of spine of soft dorsal. Alcoholic examples further differ in the dark median lateral streak or line extending level with middle of eye to caudal base, in A. vaivasensis it is silvery or leaden.

¹¹¹

Mem. Mus. Comp. Zool., vol. 26, no. 7, 1911, p. 279.

Micropteridae

Archoplites interruptus (Girard). *Fig. 143.*

Head $22\frac{2}{3}$; depth $2\frac{3}{4}$; D. XIII, II, 1; A. VII, 10, 1; scales 44 in lateral line to caudal base and 4 more on latter; 10 scales above to spin out dorsal origin, 8 above to soft and dorsal origin, 14 below to anal origin; 25 predorsal scales to interorbital; snout $4\frac{1}{8}$ in head; eye 5; maxillary $2\frac{1}{6}$; interorbital $4\frac{1}{4}$.

Body oblong, compressed; caudal peduncle long as deep or about $2\frac{3}{4}$ in total head. Head width $2\frac{3}{5}$ its length. Snout convex, length about $\frac{3}{4}$ its width. Eye center near first third in head, without mandible. Mouth large, lower jaw strongly protruding. Maxillary to hind pupil edge; expansion $1\frac{1}{4}$ in eye. Teeth fine, in bands in jaws, on vomer, palatines and 2 parallel rows on tongue. Front nostril midway in snout and hind one midway between front one and eye. Interorbital broadly convex. Cluster of radiating striae end in jagged denticles at upper hind opercle angle; preopercle, lower subopercle and interopercle edges finely serrate; also preorbital. Rakers 6 21, lanceolate, $1\frac{1}{5}$ in eye; filaments $\frac{7}{8}$ of rakers. Scales adherent, ctenoid; basal radii 10; apical denticles 52 or 53; circuli moderately fine; 8 rows of scales on cheek; lateral line concurrent with dorsal profile, tubes simple. Sixth dorsal spine 3 in head;

fourth dorsal ray 2; seventh anal spine $3 \frac{1}{8}$; third anal ray $2 \frac{1}{10}$; pectoral $1 \frac{3}{4}$; ventral $1 \frac{4}{5}$. In alcohol dull brassy-brown generally, paler below. Length 190 mm.

One without locality, likely from the Sacramento in California? *Richard's figure is labeled Sacramento River.*

Compared with paratypes of Centrarchus interruptus Girard, in the Academy. The largest of these, 166 mm., varied as follows: Head $2 \frac{1}{2}$; depth $2 \frac{1}{2}$; scales 37 to caudal base; 16 scales below lateral line to anal origin; head width $2 \frac{2}{5}$ its length; sixth dorsal spine $3 \frac{1}{3}$; sixth dorsal ray $2 \frac{2}{5}$; second anal ray about $2 \frac{1}{4}$; caudal $1 \frac{5}{6}$; pectoral $1 \frac{7}{8}$; ventral $1 \frac{9}{10}$; snout $4 \frac{1}{6}$ in head from upper jaw tip; eye $4 \frac{5}{6}$; maxillary $2 \frac{2}{5}$; interorbital $4 \frac{5}{6}$; maxillary reaches hind eye edge, expansion $1 \frac{1}{2}$ in eye; hind preopercle edge entire; rakers 1, 7+21. In alcohol dark brown, paler below; side with about 6 waved or irregular vertical deep brown bars; each scale above and on side with grayish reflection or spot, so longitudinal series within those of scales. Fins mostly pale brown. Blackish blotch on opercle.

Kuhliidae

Kuhlia rupestris (Lacépède).

Head $\frac{5}{6}$ to $2 \frac{7}{8}$; depth $2 \frac{7}{8}$; D. IX, I, II; A. III, 10; scales 40 or 41 in lateral line to caudal base and 5 or 6 more on latter; 5 scales above lateral line; 9 below; 12 predorsal scales; snout $3 \frac{1}{2}$ to $3 \frac{7}{8}$ in head, from upper jaw tip; eye

$3 \frac{2}{5}$ to $3 \frac{1}{2}$; maxillary 2; interorbital $3 \frac{2}{5}$ to $3 \frac{7}{8}$.

Body elongately ellipsoid, well compressed; least depth of caudal peduncle 1 to $1 \frac{1}{6}$ its length or $2 \frac{2}{5}$ in total head length. Head width half its length. Snout convex, length $\frac{2}{3}$ its width. Eye with hind pupil edge midway in head length. Maxillary to eye center; expansion $2 \frac{1}{6}$ to $2 \frac{1}{4}$ in eye. Mandible well protruded. Teeth conic, in rather broad bands in jaws, on vomer and palatine, none on tongue. Front nostril about last third in snout, hind on slightly larger and much nearer eye. Interorbital convex. Lower preopercle edge finely denticulate, hind edge entire; few obsolete points along lower preorbital edge; lower opercle spine much larger than upper; suprascapular edge rough or obscurely dentate. Rakers 5 or 6 16 or 17, lanceolate about twice filaments or $1 \frac{1}{2}$ in eye. Scales adherent; 8 to 12 basal radiating striae; rather long apical denticles 60 to 67; circuli fine; 4 rows of scales on cheek. Fifth dorsal spine $2 \frac{1}{6}$ to $2 \frac{1}{5}$ in dorsal ray $1 \frac{7}{8}$; third anal spine $2 \frac{7}{8}$; second anal ray 2; pectoral $1 \frac{2}{3}$ to 2; ventral $1 \frac{7}{8}$ to 2; caudal slightly emarginate.

Color in alcohol rather dark brown above edge of each scale slightly darker. Lower body surface pale, or with whitish to silvery tints. Spinous dorsal dull brown, with median horizontal dark obsolete band. Soft dorsal same general color and apical marginal dusky streak, also another similarly colored though broader, midway for length of fin.

Anal pale, with several obscure brownish basal spots. Caudal pale brown, upper and lower rays darker. Other fins dull brown. Length 27 mm. (Caudal damaged). Hawaiian Islands. We also include a Samoan example about 108 mm. long in the Academy.

Dules guamensis as figured by Hombron and Jacquinot¹¹² agrees best with these examples, though the pale edge of the caudal above and below is not shown. Their figure of D. vanicolensis shows the occiput very gibbous¹¹³.

¹¹²

Voy. Pol. Sud, Zool. Atlas, 1855, Pl. 3, fig. 1.

¹¹³

L.c., fig. 2.

Kuhlia marginata (Cuvier).

Head $2 \frac{4}{5}$ to $2 \frac{7}{8}$; depth $2 \frac{2}{3}$ to $2 \frac{7}{8}$; D. IX, I, II, 1; A. III, 12, 1, often 11, 1; scales 38? to 43 in lateral line to caudal base and 4 more on latter; 5 scales above lateral line to spinous dorsal origin, 9 below; 12 predorsal scales; snout $3 \frac{2}{5}$ to $3 \frac{7}{8}$ on head from upper jaw tip; eye $2 \frac{4}{5}$ to 3; maxillary $2 \frac{1}{8}$ to $2 \frac{1}{6}$; interorbital $2 \frac{7}{8}$ to $3 \frac{1}{10}$.

Body elongately ellipsoid. Head width 2 to $2 \frac{1}{4}$ its total length. Snout conic, length $\frac{3}{4}$ its width. Eye with hind pupil edge midway in head length. Maxillary little beyond front eye edge or about first third in eye; expansion 3 in eye. Mandible slightly protrudes. Teeth conic, fine, in bands in jaws, on vomer and palatines,

none on tongue. Nostrils together, about last fifth in snout length. Interorbital broadly conic. Lower preorbital and lower preopercle edge serrate, latter very finely; lower opercular spine large. Rakers¹⁰⁸ 12 + 22, finely lanceolate, twice filaments or $1 \frac{4}{5}$ in eye. Scales finely adherent, radiating basal striae 10 to 12; apical serrae 31 to 75; circuli basally fine with age. Fifth dorsal spine $1 \frac{2}{3}$ to 2 in head; soft dorsal spine $1 \frac{7}{8}$ to 2; third anal spine 2 to 3; first branched dorsal ray $1 \frac{3}{5}$ to $1 \frac{3}{4}$; first branched anal ray $1 \frac{7}{8}$ to 2; caudal 1 to $1 \frac{1}{10}$; pectoral $1 \frac{3}{5}$ to $1 \frac{4}{5}$; ventral $1 \frac{3}{5}$ to $1 \frac{1}{2}$.

Color in alcohol dark brown on back, with many of scales each darker or with darker spot. Sides and below with silvery-white tints. Apices of dorsal and anal dusky, also few obscure dusky spots on soft dorsal. Caudal shaded and blotched obscurely with dusky. Other fins pale. Length 55 to 130 mm. Six Hawaiian? (more likely Paumotu), three from Tahiti, one from Samoa and one from Fiji. A small example without date may be Samoan?

Kuhlia sandvicensis (Steindachner). *Figs. 144 and 145*

Head $3 \frac{1}{5}$ to $3 \frac{1}{4}$; depth $2 \frac{2}{3}$ to $2 \frac{3}{4}$; D. IX or X, 9 to I, 11; A. III, ii, 1; scales 49 or 50 in lateral line to caudal base above lateral line to spinous dorsal origin, 11 to 13 below; predorsal scales 12 or 13; snout $3 \frac{7}{8}$ to 4 in head from upper jaw tip; eye $2 \frac{7}{8}$ to $3 \frac{1}{5}$; maxillary $2 \frac{1}{2}$ to $2 \frac{3}{5}$; interorbital $3 \frac{1}{10}$ to $3 \frac{1}{4}$.

Body elongately ellipsoid, compressed; least depth of caudal peduncle $1 \frac{2}{5}$ to $1 \frac{2}{3}$ its length or $2 \frac{2}{5}$ to $2 \frac{1}{2}$ in total head length. Head width 2 to $2 \frac{1}{10}$ its length. Snout conic, width $\frac{2}{3}$ its length. Eye with hind pupil edge about midway in total head length. Mandible well protruded. Maxillary extends little beyond eye front but not quite to pupil; expansion 3 in eye. Teeth in bands, minute, simple, in jaws, on vomer and palatines, none on tongue. Nostrils small, together, about midway in snout. Interorbital broadly convex. Preopercle edge minutely and obscurely denticulate, gash just above corner; lower opercular spine string. Rakers $12+24$, lanceolate, filaments. $\frac{5}{6}$ of rakers which 2 in eye. Scales adherent; radiating basal striae 8 to 13; apical serrae 90 to 102; circuli very fine; cheek scales in 4 rows; lateral line complete, of small, simple tubes, cinct with dorsal profile. Fifth dorsal spine $1 \frac{4}{5}$ to $1 \frac{7}{8}$ in head; third anal spine $2 \frac{1}{3}$ to $2 \frac{9}{10}$; pectoral $1 \frac{1}{2}$; ventral $1 \frac{4}{5}$ to 2; caudal slightly longer than head.

Color in alcohol dull brown generally, paler below and washed most everywhere with silvery. Fins and iris dull brown. Hind caudal edge with trace of dusky. Length 77 to 258 mm. Thirty-nine examples from Hilo, Mani, Oahu, Hawaiian Islands, Wake Island and Fiji. The smaller examples vary

in showing. Head 3; depth $2\frac{1}{2}$ to $2\frac{2}{3}$; scales 47 to 49 in lateral line to caudal base; 6 scales above lateral line; 11 below; eye $2\frac{3}{4}$ to $2\frac{7}{8}$ in head from upper jaw tip; maxillary $2\frac{2}{5}$ to $2\frac{1}{2}$; interorbital $3\frac{1}{5}$ to $3\frac{1}{2}$; head width $2\frac{1}{10}$ to $2\frac{1}{4}$ in its total length; hind eye edge very slightly advanced to center in head length; hind preopercle edge entire, lower minutely serrated; fifth dorsal spine $1\frac{2}{5}$ to $1\frac{2}{3}$; third anal spine $2\frac{1}{10}$ to $2\frac{1}{6}$; pectoral $1\frac{2}{5}$ to $1\frac{1}{2}$; ventral $1\frac{3}{4}$ to $1\frac{4}{5}$; scales with 9 to 14 basal radii, apical serrae 36 to 40; rakers 11 + 21.

Serranidae.

Acanthistius pictus (Tschudi). *Fig. 146.*

Head $1\frac{2}{5}$; depth $2\frac{3}{4}$; D.XI, 17, 1; A.III, 7, 1; scales about in lateral line to caudal base and 30 or more on latter; tubes 80 in lateral line to caudal base and 10 or more on latter; 28 scales above lateral line to first dorsal spine base, 24 above to first dorsal ray base, about 60 below to anal origin; 83 predorsal scales, snout 4 in head from upper jaw tip; eye $6\frac{2}{3}$; maxillary $2\frac{1}{8}$; interorbital $6\frac{1}{5}$.

Body well compressed, back elevated; least depth of caudal peduncle equals its length or $3\frac{3}{5}$ in total head length. Head width $2\frac{1}{3}$ its length. Snout length about

$7/8$ its width. Eye elevated, front pupil edge about first third in head. Maxillary to hind eye edge; expansion equals eye. Mouth large, lower jaw well protruded. Lips thick, coriaceous and greatly papillose. Bands of fine teeth in jaws, on vomer and palatines; jaws with outer row of strong, though short, enlarged conic teeth, strongly anteriorly, tongue smooth. Nostrils conspicuous, together, front one at last fourth in snout. Interorbital broadly convex. Hind preopercle edge denticulate, and serrae enlarged gradually to angle until 3 turned forward and much larger along lower edge; median opercular spine longest, most posterior and closer to lower. Rakers v , $2+12$, lanceolate, $1\frac{1}{4}$ in filaments, which equal eye. Scales strongly ctenoid, minute on lower surface of head, predorsal, fins, basally and body edges generally; basal striae 6 to 9; apical denticles 15 to 26, strong, conic, sometimes with expanded to truncate tips; circuli coarse, 26 to 40; lateral line concurrent with dorsal profile, midway along caudal peduncle side to caudal base, of narrow, simple tubes. Fourth dorsal spine $3\frac{2}{5}$ in head; third dorsal ray 3; second anal spine $3\frac{5}{6}$; third anal ray $2\frac{1}{5}$; truncate caudal 2; pectoral $1\frac{5}{6}$; ventral 2. In alcohol uniform dull umber brown. Length 295 mm. Example

without locality, ~~though doubtless from Valparaiso.~~ *Drawing by J. H. Richard of an example from Callao.*

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Acanthistius brasiliensis (Cuvier). *Fig. 147*

Head $2 \frac{2}{5}$; depth $2 \frac{2}{5}$; D. XIII, 15; A. III, 8, 1; scales 112 in lateral line to caudal base and 14 large ones on latter; 52 tubes in lateral line to caudal base and 4 more on latter; 25 scales above lateral line to spinous dorsal origin, 16 to seventh dorsal spine base, 43 below to spinous anal origin; about 70 predorsal scales; snout $4 \frac{3}{4}$ in head from upper jaw tip; eye $4 \frac{1}{8}$; maxillary $2 \frac{1}{10}$; interorbital $6 \frac{1}{4}$.

Body deeply ellipsoidal, well compressed; caudal peduncle about deep as long, least depth $3 \frac{1}{8}$ in total head length. Head width half its length. Snout conic, length $\frac{3}{5}$ its width. Eye center slightly before first third in head. Mouth large, lower jaw very slightly protrudes; Maxillary almost to hind eye edge; expansion $1 \frac{2}{5}$ in eye. Fine teeth in narrow bands in jaws; pair of wide-set canines in front of upper jaw, another closer at front of lower and canine on mandibular ramus little before middle; band of fine teeth on vomer and each palatine, none on tongue. Front nostril at last third in head; hind nostril midway between front one and eye. Interorbital broadly convex. Hind preopercle edge finely serrate and 3 strong antrorse spines in lower edge; lower opercular spine in advance of upper, median most backward and closer to lower. Rakers iv, 3 + 12, lanceolate; filaments $\frac{4}{5}$ of rakers, which $1 \frac{7}{8}$ in eye.

Scales adherent; basal radiating striae 7 to 10; apical denticles 28 to 32; circuli fine. Fifth dorsal spine $2\frac{1}{4}$ in head; second anal spine $2\frac{1}{2}$; rounded caudal $1\frac{2}{3}$; pectoral $1\frac{2}{5}$; ventral $1\frac{9}{10}$. In alcohol dark uniform dusky-brown. Length 125 mm. Rio Janeiro.

Cephalopholis argus (Schneider). *Fig. 148.*

Head $2\frac{1}{2}$; depth $2\frac{7}{8}$ to $3\frac{1}{5}$; D. IX, 15, 1; A. III, 9, 1; scales 88 to 97 in lateral line to caudal base, and about 12 more on latter; tubes about 45 in lateral line to caudal base and 5 more on latter; 18 scales above lateral line to spinous dorsal origin, 25 to 30 below to spinous anal origin; 60 to 88 predorsal scales; snout $3\frac{1}{4}$ to $3\frac{5}{6}$ in head from upper jaw tip; eye $6\frac{3}{4}$ to $7\frac{4}{5}$; maxillary $1\frac{7}{8}$ to $1\frac{9}{10}$; interorbital 7 to $7\frac{1}{4}$.

Elongately ovoid, compressed; least depth of caudal peduncle $2\frac{7}{8}$ to 3 in total head length; or caudal peduncle length $\frac{1}{2}$ to $\frac{3}{4}$ its least depth. Head width $2\frac{1}{2}$ its length. Snout conic, length $\frac{4}{5}$ to $\frac{7}{8}$ its width. Eye advanced, center at first third in head length, or center at first $\frac{2}{5}$ in younger example. Mouth large, mandible strongly protruding. Maxillary to hind eye edge in young, slightly beyond in larger example; expansion equals eye. One canine each side above in front, followed by outer row of moderate erect teeth; pair of lower close-set symphyseal canines, followed by outer row of teeth similar to upper; bands of inner teeth in both jaws depressible, 5 or 6 irregular rows below with innermost

much longest; bands of minute pointed teeth on vomer and palatines. Nostrils together, close before eye. Interorbital convex. Hind preopercle edge with numerous minute obsolete serrae. Median opercular spine longest, most posterior and closer to lower. Rakers 2+8, lanceolate, asperous, equal filaments; which about 2 in eye. Scales finely ctenoid; basal striae 7 or 8, radiating; apical denticles fine, 32 to 36; circuli ~~apical denticles fine~~, coarse; 34 rows of scales besides numerous small auxiliary scales, across cheek to preopercle corner; upper 2/3 of maxillary finely scaled; fins all more or less finely scaled; lateral line arched toward middle of spinous dorsal base, then midway along caudal peduncle side. Fourth dorsal spine 4 to 4 1/3 in total head length; second anal spine 4 1/4 to 4 1/3; caudal rounded, 1 4/5 to 2; pectoral 1 4/5 to 2 1/10; ventral 2 1/10 to 2 1/4. Color largely uniform dusky brown. Body marked everywhere with obscure grayish spots, small and edged with dusky or blackish. Narrow pale edge to soft dorsal, anal and caudal. Length 233 to 340 mm. One from Pomoton. We also include two examples in the Academy from Thornton Island.

Cephalopholis urodelus (Cuvier). *Fig-149.*

Head 2 1/3; depth 3; D. IX, 15; A. III, 9, 1; scales 90 in lateral line to caudal base and 15 large ones on latter; tubes 58 in lateral line to caudal base and 4 more on latter; 18 scales above lateral line to spinous dorsal base, 8 above to sixth dorsal spine base, 24 below to anal origin; about

90 predorsal scales; snout 4 in head from upper jaw tip; eye 6, maxillary 2; interorbital $7\frac{1}{2}$.

Body elongately fusiform, compressed; least depth of caudal peduncle $3\frac{2}{5}$ in head or equals its own total length. Head width $2\frac{2}{5}$ its length. Snout length $\frac{3}{4}$ its width. Eye close to upper profile, hind edge about $\frac{1}{4}$ its diameter in advance to head center. Mouth large, lower jaw well protruded. Maxillary extends little beyond hind eye edge; expansion $1\frac{1}{6}$ in eye. Pair of close-set short erect canines in front above each side (left fallen); similar smaller pair each lower side in front (right fallen); upper outer canines followed by row of moderately large erect outer teeth and lower with lower row or close-set more numerous recurved erect teeth; bands of inner teeth in both jaws depressible, upper inner and lower inner laterals larger; narrow bands of minute pointed teeth on vomer and palatines. Nostrils together, close before eye. Interorbital slightly convex, with equally concave median depression. Hind preopercle edge obsolete with small uneven serrae, none below; median opercular spine largest, most posterior and closer to lower. Rakers vii 2+10 vi, lanceolate; filaments $\frac{2}{3}$ of rakers, which $1\frac{7}{8}$ in eye. Scales cycloid; apical circuli about 40 to 60; basal striae 7 to 9 on body, 0 to 6 on small scales; about 33 scales across cheek; only upper half of maxillary finely scaled; fins all finely scaled from out over basal portions; lateral line arched up toward middle

of spinous dorsal base, then falls midway along caudal peduncle side.

Fourth dorsal spine $3 \frac{1}{6}$ in head; second anal spine 3; rounded caudal $1 \frac{3}{4}$; pectoral $1 \frac{2}{3}$; ventral $2 \frac{1}{10}$; fin almost reaches vent. Color in alcohol faded dull uniform brownish generally. Head above, back, dorsal and caudal all finely spotted with darker, though towards soft dorsal, caudal and anal spots more with mottled appearance, larger and irregular. Pectoral with obsolete small dark crowded spots basally. Length 178 mm. Pomoton.

Compared with Günther's figure of Serranus urodelus¹¹⁴ traces of the pale apical or marginal portion of the pectoral are evident, also the 2 pale or whitish oblique caudal bars. Our example differs in showing longitudinal waved pale lines below the lateral line in the costal region, and the spots are much more irregular than in the figure. No trace is now seen of the pale submarginal reddish lines Günther's figure also shows.

¹¹⁴

Journ. Mus. Godeffroy, vol. 3 (1), 1873, p. 3, Pl. 3, fig. A.

Serranus

Epinephelus maculatus (Bloch).

Head $2 \frac{1}{3}$; depth $2 \frac{5}{6}$; D. XI, 17, 1; A. III, 8, 1; scales 100 in lateral line to caudal base and about 10 large ones on latter; tubes 52 in lateral line to caudal base and

5 more on latter; 22 scales above lateral line to spinous dorsal spine base, 29 below to spinous anal origin; 86 predorsal scales; snout $5 \frac{2}{5}$ in head from upper jaw tip; eye $5 \frac{2}{5}$; maxillary $2 \frac{1}{6}$; interorbital 8.

Body elongately ovoid, deepest forward, well compressed; caudal peduncle length about $\frac{5}{6}$ its least depth, which $3 \frac{1}{2}$ in total head length. Head width $2 \frac{2}{5}$ its length. Snout length $\frac{3}{5}$ its width. Eye close to upper profile, its hind edge about half an eye-diameter in advance of center in head length. Mouth large, lower jaw protruding. Maxillary extends back little beyond hind eye edge; expansion $1 \frac{3}{5}$ in eye. Pair of well-spaced canines in front of each jaw, ~~lower closer; bands of teeth in jaws, inner~~
~~front of each jaw~~ lower closer; bands of teeth in jaws, inner depressible, several front inner upper ones elongated; lower teeth form 2 rows on each side of jaw; moderate conic teeth in bands on vomer and palatines. Nostrils together, close before eye. Interorbital slightly convex. Hind preopercle edge denticulate, with serrae coarser until angle, none below; median opercular spine most backward, closer to lower. Rakers v, 3+10, vi, lanceolate, though robust; filaments $\frac{3}{4}$ of rakers, which $2 \frac{1}{10}$ in eye. Scales cycloid; basal striae 4 or 5; circuli moderate and apically broken as very heterogeneous short sections; 43 scales on cheek; about upper fourth of maxillary only finely scaled; lateral line concurrent with dorsal profile, slopes until midway on caudal base.

Third dorsal spine $2 \frac{7}{8}$ in head; second anal spine $2 \frac{2}{3}$; rounded caudal $1 \frac{2}{3}$; pectoral $1 \frac{2}{3}$; ventral $2 \frac{1}{10}$. Color in alcohol dull umber-brown, marked everywhere with sparse dark brown spots, mostly rounded and about size of pupil. Soft dorsal, anal and caudal edges apparently very narrowly whitish. Pectoral and ventral with smaller spots than body. Length 190 mm. Samoa.

We compared this example with examples in the Academy of ~~S.~~ areolatus (Forsk^oal), from Sumatra and the Philippines, but which were wrongly listed by Fowler as ^{pinephelus} E. maculatus.¹¹⁵ While the two species are quite similar in their spotted coloration, the spots of our Samoan E. maculatus are more sparse, very much larger and fewer on the fins; the larger spines at the preopercular angle are much less conspicuous; the maxillary reaches well beyond the eye, while in E. areolatus it extends little beyond the eye center, etc.

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Journ. Acad. Nat. Sci. Phila., (2) vol. 12, 1904, p. 524,
Copeia, no. 58, June 18, 1918, p. 63.

Serranus

Epinephelus fasciatus (Forsk^oal).

Head $2 \frac{2}{5}$ to $2 \frac{1}{2}$; depth $3 \frac{1}{5}$ to $3 \frac{1}{2}$; D. XI, 15, to 17, 1; A. III, 8, 1; scales 92 to 111 in lateral line to caudal base and 8 to 12 large scales on latter; tubes 67 to 70 in lateral line to caudal base and 5 to 8 more on latter; 15 to 20 scales above lateral line to spinous dorsal origin; 11 or 12 to sixth dorsal spine base, 25 to 32 below to spinous anal

origin 82 to 102 predorsal scales; snout 4 to $4\frac{1}{4}$ in head from upper jaw tip; eye 5 to $5\frac{2}{3}$; maxillary 2 to $2\frac{1}{10}$; interorbital $7\frac{1}{3}$ to $7\frac{3}{5}$.

Body elongate, deeper forward, well compressed; caudal peduncle length about $4\frac{4}{5}$ to $7\frac{7}{8}$ its least depth, which $3\frac{1}{2}$ to $3\frac{2}{3}$ in total head length. Head width $1\frac{7}{8}$ to 2 in its length. Snout length about $\frac{2}{3}$ to $\frac{3}{4}$ its width at eye front. Eye close to upper profile, hind edge about $\frac{1}{4}$ eye-diameter before head center. Mouth large, lower jaw well protruded. Maxillary extends back little beyond hind eye. Pair of well-spaced canines in front of each jaw, lower closer; bands of teeth in jaws, inner depressible and largest above in front and below laterally; lower teeth form 3 rows on each side of jaw, outer row firm, uncurved; narrow bands of pointed teeth on vomer and palatines.; Nostrils together, close before eye. Interorbital scarcely convex, with concave depression in front. Hind preopercle edge serrate, lower serrae larger, none on lower edge; median opercular spine longest, most backward and variously closer to upper or lower. Rakers II to IV, 4 to 12 or 13, IV to VI, lanceolate; filaments $\frac{3}{5}$ to $\frac{4}{5}$ of rakers, latter $1\frac{3}{5}$ to $2\frac{1}{10}$ in eye. Scales on head, breast, prepectoral and predorsal cycloid; body scales finely ctenoid; apical denticles about 20 to 27; basal striae 4 to 7; about 30 scales on cheek; only upper half of maxillary scaled finely; fins all finely scaled basally; lateral line

concurrent with dorsal profile, midway along caudal peduncle side.

Fifth dorsal spine 3 to $3 \frac{1}{8}$ in head; second anal spine $2 \frac{7}{8}$ to $3 \frac{4}{5}$; rounded caudal $1 \frac{3}{5}$ to $1 \frac{7}{8}$; pectoral $1 \frac{4}{5}$ to 2; ventral 2 to $2 \frac{1}{8}$. Color in alcohol bistre generally. Five dusky to deep brown saddles along back, each wider than interspaces and reflected down on sides to form as many obscure transverse bands. Body and fins everywhere, except on head below, breast and belly, marked irregularly with rather well spaced variable gray-white specks or dots, on cheek and head below forming rather large reticulations. Spots on pectoral very small and on ventrals only terminal. Membrane tips between dorsal spines dusky. Length 148 to 270 mm. Two from Pomotou and one from Tahiti. We also include a Philippine example in the Academy.

The larger Pomotou example is strikingly variable in color pattern, in that the head above and laterally is pale brown, generally marked with very numerous close-set or crowded round spots. As these continue on the body the pale reticulating lines encircling them become disconnected more or less vertically, so that the body appears marked with more or less waved longitudinal streaks. This effect also extends upward on the spinous dorsal basally. Though the small white spots distinct on soft dorsal, anal, caudal and pectoral, not apparent or faded from ventral. Traces of the dark saddles

along the bases of the dorsal still evident.

Epinephelus zapyrus Seale¹¹⁶ is described without sufficient characters to distinguish it from E. fasciatus as given by Boulenger¹¹⁷. Apparently the only distinction would be the "uniform scarlet vermilion color, the fins tipped with orange, the spinous dorsal with a tip of deep crimson". Boulanger gives the color as "red or pale brown, with or without" markings, "and membrane between dorsal spines broadly tipped with black". In his Mangareva examples of E. fasciatus Seale says of the color "in spirits the white dots disappear", though the two Wilkes examples have doubtless been in alcohol for 80 years and they show them very distinct.

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Occas Pap. Bishop Mus., vol.4, no.1, 1906, p.36, fig. 11, Tubuai Islands.

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Cat. F.Brit.Mus., Ed. 2, vol.1, 1895, p. 238.

~~Epinephelus~~^{Serranus} merra (Bloch). *Fig. 150 to 153.*

Head $2 \frac{2}{5}$ to $2 \frac{1}{2}$; depth $3 \frac{1}{5}$ to $3 \frac{1}{3}$; D.XI, 16, 1, once 15, 1; A. III, 8; scales 96 to 112 in lateral line to caudal base and 10 or 11 large ones on latter; tubes 50 to 52 in lateral line to caudal base and 3 or 4 more on latter; 16 to 20 scales above lateral line to spinous dorsal origin, 10 or 11 above to sixth dorsal spine base, 32 to 34 below to spinous anal origin; 90 to 118 predorsal scales, 50 in young;

snout $5 \frac{1}{8}$ to $5 \frac{2}{5}$ in head from upper jaw tip; $4 \frac{1}{2}$ in young; eye $4 \frac{1}{2}$ to $5 \frac{1}{8}$, $3 \frac{1}{2}$ in young; maxillary 2 to $2 \frac{1}{10}$; interorbital $7 \frac{1}{6}$ to $8 \frac{1}{4}$.

Body elongately ellipsoid; least depth of caudal peduncle $3 \frac{1}{4}$ to $4 \frac{4}{5}$ in total head length, $3 \frac{1}{2}$ in young. Head width $2 \frac{1}{3}$ to 3. Snout conic, length $\frac{3}{5}$ to $\frac{2}{3}$ its width. Eye center very slightly advanced before first third in head; front pupil edge at first third in young. Mouth large, lower jaw strongly projects. Maxillary extends little beyond hind eye edge; about opposite hind eye edge in young. Maxillary expansion $1 \frac{1}{2}$ to $1 \frac{2}{3}$ in eye; $1 \frac{1}{3}$ in young. Teeth conic, inner elongated ones depressible; pair of canines in front of each jaw, upper wider, one or both sometimes double; lower teeth triserial in front, become biserial behind; almost entirely biserial in very young and some variants; bands of small teeth on vomer and palatines, none on tongue. Nostrils separated, first about last third in snout; hind nostril midway between front one and eye. Interorbital slightly convex, with slight depression in front. Hind preopercle edge finely denticulate, 2 or 3 enlarged denticles at angle, none below; serrae fewer and coarser in young, and usually but 1 or 2 large spines at angle; median opercular spine most backward, median in position, and lower behind upper. Rakers iv, 1 to 3 + 8 to 11, iv to viii, lanceolate, $2 \frac{1}{4}$ in eye; filaments $\frac{3}{4}$ of rakers.

Scales adherent; basal striae 6 or 7; apical denticles 21 or 22 ; circuli moderate; lateral line concurrent with dorsal profile, midway along caudal peduncle side, tubes, simple.

Fourth dorsal spine $2 \frac{2}{5}$ to $3 \frac{1}{8}$ in head; second anal spine $2 \frac{2}{3}$ to $2 \frac{7}{8}$; caudal rounded; $1 \frac{4}{5}$; pectoral $1 \frac{2}{3}$ to $1 \frac{5}{6}$; ventral 2 to $2 \frac{1}{10}$. Color in alcohol deep brownish generally, with dusky cloudings. Body and fins entirely covered with brown and dusky-brown spots of various size ot large on belly and under surface and very small on fins. Spots separated by a honey-combed network of light or whitish lines. Along back darker spots form about 4 obsolete transverse in distinctly defined bands. Pectoral pale or whitish, spotted with blackish and as spots enlarge at base of fin becoming separated by white reticulations. Spots of dusky-brown on ventral large, towards lower front of fin fused and blackish, though edge narrowly white. Margins of rayed vertical fins variously whitish, that of caudal broader. Iris dusky, margin around pupil narrowly gilt. Young differ chiefly in larger and fewer spots and pale ventrical fins. Length 51 to 205 mm. Six from Fiji, one from Samoa, and 2 without locality. We also include Samoan and Thornton Island examples in the Academy.

~~Serranus~~
~~Epinephelus~~ Serranus socialis ~~Günther~~. Fig. 154.

Colored figure, without data.

Serranus summana (Forsk.) Fig. 155.

Figure of example from Pomotua by
J. H. Richard.

Serranus bleekeri Vaillant. Fig. 156.

Drawing by J. H. Richard of an example
from Vanda. This species previously
known only from the East Indies.

Serranus diacanthus Valenciennes. Fig. 156a.

Drawing by Richard, without data,
1860.

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Serranus
Epinephelus morio (Valenciennes). Fig. 157.

Head, $2 \frac{1}{3}$; depth $2 \frac{5}{6}$; D.XI, 16, i; A. III, 8, i; scales about 143 in lateral line to caudal base and 14 large ones on latter; tubes 58 in lateral line to caudal base and 5 more on latter; 35 scales above lateral line to spinous dorsal origin; 19 above to soft dorsal origin, 52 below to spinous anal origin; snout $3 \frac{2}{5}$ in head from upper jaw tip eye $5 \frac{2}{5}$; maxillary $2 \frac{1}{6}$; interorbital 6; rakers v, 4 11, iv; scales with basal striae 5 or 6, and circuli moderate, terminate with 24 to 30 apical denticles; first dorsal spine $2 \frac{1}{2}$ in second, which longest; uniform dark brownish in alcohol; length 222 mm. No locality, though doubtless from Rio Janeiro? It agrees with a Florida example in the Academy.

Mycteroperca ruber (Bloch) Fig. 158.

Head $2 \frac{1}{2}$; depth 3; D. XI, 16, i; A. III, 11, i; scales 98 in lateral line to caudal base and 10 large ones on latter; tubes 74 in lateral line to caudal base and 9 more on latter; scales above lateral line 21 to spinous dorsal origin, 17 to soft dorsal origin; 35 below to spinous anal origin; about 80 predorsal scales; snout 4 in head from upper jaw tip; eye $4 \frac{2}{3}$; maxillary $2 \frac{1}{6}$; interorbital $5 \frac{1}{6}$.

Body compressed, elongately fusiform; length of caudal peduncle about $\frac{7}{8}$ its least depth, which $2 \frac{7}{8}$ in total head length. Head width 3 in its length. Snout long as wide. Mouth large, mandible well protruded. Maxillary nearly to hind eye edge; expansion $1 \frac{3}{4}$ in eye. Teeth fine, in narrow bands in jaws,

several inner front upper elongated and depressible; pair of upper wide-set canines, also apparently closer-set pair below; inner mandibular teeth largest and others disappear behind, though anteriorly form rather irregular outer row; band of fine teeth on vomer and palatines, none on tongue. Front nostril about last third in snout; hind nostril midway between front one and eye. Interorbital slightly convex. Hind preopercle edge minutely and rather evenly denticulate; cluster of 4 subequal conspicuous spines at angle, none below; median opercular spine most backward, closer to lower, though latter before uppermost. Rakers 21 to 35, finely lanceolate, twice filaments or $1\frac{1}{4}$ in eye. Scales finely ctenoid; 6 to 8 radiately basal striae; about 24 apical denticles; circuli fine; scaly suprascalula entire; lateral line concurrent with back, midway along side of caudal peduncle to caudal base; small tubes simple.

Third dorsal spine $2\frac{7}{8}$ in head; second anal spine $3\frac{1}{5}$; truncate caudal $1\frac{2}{5}$; pectoral $1\frac{1}{2}$, ventral $1\frac{2}{3}$. Color in alcohol deep brown generally; brown streaks from lower eye edge toward lower pectoral base, another along and above upper maxillary edge down below preopercle corner. Head above and trunk marked with waved lengthwise lines, somewhat reticulated. Fins brown, rayed vertical ones with more or less waved streaks of dark, transverse or caudal. Pectoral brown. Ventral with dusky terminally. Length 165 mm. Rio Janeiro.

Paralabrax humeralis (Valenciennes)

Head $2 \frac{2}{5}$; depth $3 \frac{3}{5}$; D. X, 13, 1; A. III, I, 1; scales 81 in lateral line to caudal base and 8 more in latter; tubes 61 in lateral line to caudal base and 5 more on latter; 16 scales above lateral line to spinous dorsal origin; 10 above to soft dorsal origin, 24 below to spinous anal origin; about 60 predorsal scales; snout 4 in head from an upper jaw tip; eye $5 \frac{1}{6}$; maxillary $2 \frac{2}{5}$; interorbital $5 \frac{1}{2}$.

Body elongately fusiform, compressed; least depth of caudal peduncle $\frac{3}{4}$ its length or $3 \frac{3}{4}$ in total head length. Head width $2 \frac{1}{3}$ its length. Snout length about $\frac{4}{5}$ its width. Eye with hind edge advanced $\frac{1}{3}$ its own diameter before center in head. Mouth large, mandible moderately protruding. Maxillary to eye center; expansion $1 \frac{7}{8}$ in eye. Teeth simple, firm, conic, upper bands narrows behind and outer row slightly larger; lower band in front, single row laterally; bands of fine teeth on vomer and palatines, none on tongue. Front nostril about last $\frac{2}{5}$ in snout length, with skinny flap about $\frac{1}{4}$ of eye; hind nostril simple pore midway between front nostril and eye. Interorbital flattened. Preopercle edge finely denticulate, though denticles little enlarged around angle and on lower edge directed gradually forward; median opercular spine much larger and more backward than others, closer to lower. Rakers

10+19, lanceolate, equal filaments or $1 \frac{3}{5}$ in eye. Scales ctenoid, radiating basal striae 5 to 13; apical denticles about 31 to 45; circuli fine; cheek with 26 rows of scales; maxillary, muzzle and interorbital naked; suprascapula denticulate; lateral line concurrent with dorsal profile, midway along caudal peduncle to caudal base, tubes, simple.

Third dorsal spine $2\frac{1}{2}$ in head; second anal spine 4; caudal apparently truncate, $1\frac{3}{4}$; pectoral $1\frac{1}{2}$; ventral $1 \frac{7}{8}$. Color in alcohol brown above, paler below. Each scale row with dark median line above lateral line; from which scale rows slope upward and backward. Each scale row with pale median line below lateral line, where scales in horizontal or longitudinal rows. Spinous dorsal dusky terminally. Soft dorsal, soft anal, caudal and ventral with many dark ocelli in membranes, most conspicuous or only present terminally on most. Pectoral dull brown, with several dark spots about base. Length 174 mm. Callao.

We have also examined skin, 439 mm. long, from Valparaíso, Chili, now in the Commercial Museum of Philadelphia. It shows: Head 3; depth $3\frac{1}{2}$; D.X, 12, 1; A. III, 7, 1; tubes 63 in lateral line to caudal base and 6 more on latter; 12 scales above lateral line, 18 below; snout $2 \frac{1}{3}$ in head from upper jaw tip; eye 6; maxillary $2 \frac{2}{5}$; interorbital $4 \frac{1}{5}$;

maxillary to front pupil edge; preopercle with rough serrate edge, serrae but little enlarged at lower corner, and lower ones not turned forward; scales but little smaller on head above; third dorsal spine longest; anal spines moderate, second longest; dull brown.

The Callao example agrees largely with the figure of Serranus albomaculatus of Jenyns¹¹⁸, though the scales are not shown sloping up above lateral line or horizontal below it. No traces of white spots are to be found on our example

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Zool. Voy. Beagle, Fishes, 1842, p. 3, Pl. 2 (Galapagos).

Paralabrax callaensis Starks. *Fig. 159.*

Head $2 \frac{2}{5}$; depth 3; D. X, 14, 1; A. III, 7; scales about 87 in lateral line to caudal base; tubes 67 in lateral line to caudal base and 7 more on latter; 17 scales above lateral line to spinous dorsal origin, 12 to soft dorsal origin, 26 below to spinous anal origin; 56 predorsal scales to front of eyes; snout 4 in head from upper jaw tip; eye 5; maxillary $2 \frac{1}{3}$; interorbital $5 \frac{4}{5}$.

Body elongately ovoid, deepest forward, back little elevated; last depth of caudal peduncle $\frac{7}{8}$ its length or $3\frac{1}{4}$ in head. Head width $2 \frac{2}{5}$ its length. Snout about long as wide. Eye advanced, before center in head about $\frac{1}{3}$ eye-diameter. Mouth large, lower jaw projecting. Maxillary nearly opposite hind pupil edge; expansion $1 \frac{4}{5}$ in eye.

Double pair of close-set upper canines in front, wider-set double pair below, of which respective teeth on each side also wider spaced; fine conic teeth in bands in jaws, on vomer and palatines; lower teeth largely in serial laterally, or only short inner row of smaller ones in front. Nostrils near together; front one about last $2/5$ in snout. Interorbital slightly convex. Hind preopercle edge finely denticulate, though serrae gradually become larger below; lower preopercle edge with few fine or mostly concealed denticles; median opercular spine most posterior, near lower; suprascapula dentate. Rakers $13+19$ ii, lanceolate, about long as filaments or $1 \frac{2}{5}$ in eye. Scales ctenoid; basal striae 8 or 9; circuli moderately fine and 35 to 40 apical denticles; 30 rows of scales on cheek; maxillary, snout and mandible scaleless; lateral line concurrent with dorsal profile, slopes until midway on caudal base.

Third dorsal spine much longest, $2\frac{1}{4}$ in head; second anal spine $2 \frac{3}{5}$; caudal $1 \frac{9}{10}$, nearly truncate, hind edge convex when expanded; pectoral $1 \frac{2}{3}$; ventral $1 \frac{2}{3}$. Color in alcohol very dark or dusky-brown, with slight olive tinge on sides and below. Sides, back and head with many coarse obscure deep lengthwise streaks, some waved, others broken and on cheeks assume round close-set spots. Fins with all

with more or less dark or dusky terminally. Length 193 mm.

One without locality, doubtless from Peru? *Richard's*
figure is labeled Peru.

Our example shows the cheeks with the dark waved horizontal streaks of Starks' figure¹¹⁹ broken as rounded spots.

¹¹⁹

Proc. U.S.Nat.Mus., vol.30, 1906, p. 787, Pl. 65, fig. 2

Hypoplectrodes semicinctus (Valenciennes). *Fig. 159a*

Head $2\frac{1}{4}$ to $2\frac{1}{2}$ depth $2\frac{2}{5}$; D.X, 19 1 or 20, 1; A. III, 8, 1; scales 46 48 in lateral line to caudal base and 6 large ones on latter; 43 or 44 tubes in lateral line to caudal base and 6? more on latter; 7 or 8 scales above lateral line to spinous dorsal origin, 18 or 19 below to spinous anal origin; about 53 to 55 predorsal scales; snout $3\frac{1}{8}$ to $3\frac{1}{3}$ in head from upper jaw tip; eye 5 to $5\frac{3}{4}$; maxillary $2\frac{1}{8}$; interorbital $6\frac{2}{3}$ to 7.

Body rather deeply ellipsoid, well compressed; caudal peduncle length about $\frac{2}{3}$ to 1 its least depth, which $3\frac{1}{3}$ in total head length. Head width $1\frac{7}{8}$ to $2\frac{1}{8}$ its length. Snout rather conic, long as wide. Eye with hind edge midway in head length. Mouth large, mandible protruding. Maxillary to front pupil edge; expansion 1 to $1\frac{1}{8}$ in eye. Teeth fine, in narrow bands in jaws; several inner front upper teeth little enlarged, likewise little inner group patch; inner lower teeth

form enlarged row; double pair of short canines in front of each jaw, upper wider apart, and canines single in younger example, short canine little before middle along each mandibular ramus; bands of small teeth on vomer and palatines, none on tongue. Nostrils close; front one about last fourth in snout. Interorbital little convex. Hind preopercle edge evenly denticulate, and 3 strong antrorse spines on lower edge; lower edges of subopercle and interopercle finely denticulate; median opercular spine most backward, closer to lower and both longer than upper; supracarpal dentate. Rakers v, 2 10, v, lanceolate; filaments $\frac{7}{8}$ of rakers, which half of eye. Scales adherent, ctenoid; basal striae 9 to 13; apical denticles 52 to 75; circuli very fine; lateral line strongly arched till below middle in spinous dorsal, nearly midway along caudal peduncle side to caudal base medially and broad, simple, tubes obsolete. Fourth dorsal spine $2\frac{1}{2}$ to 3 in head, tenth little longer than second; second anal spine $2\frac{2}{4}$ to 3; pectoral $1\frac{1}{4}$ to $1\frac{1}{2}$; ventral 2. In alcohol dull uniform brownish generally. Length 120 to 165 mm.

(caudal damaged). Sydney. *Two drawings by Richard, both labeled Sydney.*

We accept Hypoplectrodes Gill¹²⁰, without diagnosis, in place of Gilbertia Jordan and Eigenmann¹²¹.

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Proc. Acad. Nat. Sci. Phila., 1862, p. 23. Type Plectropoma nigrarubrum Valenciennes, monotypic.

121

Bull. U.S.F.Com., vol. 8, 1888 (1890), p. 346. Type P. semicinctum Valenciennes, designated.

Endulus auriga (Cuvier). Fig. 160.

Drawing by J. H. Richard of an example from Rio Janeiro.

Primodes fasciatus junys. Fig. 161.

Drawing by Richard from an example from Callao.

Diplectrum radiale (Quoy and Gaimard). *Fig. 162.*

Head 3; depth $3 \frac{3}{5}$; D.X, 12, 1; A.III, 7, 1; scales 60 in lateral line to caudal base and 10 large ones in latter; tubes 48 in lateral line to caudal base and 4 more on latter; 8 scales above lateral line to spinous dorsal origin, 6 above to fourth dorsal spine base; 15 below to spinous anal origin; 18 predorsal scales; snout $4 \frac{1}{5}$ in head from upper jaw tip; eye 5; maxillary $2 \frac{1}{4}$; interorbital $5 \frac{1}{4}$.

Body elongately fusiform; least depth of caudal peduncle $\frac{7}{8}$ its length or $2 \frac{7}{8}$ in total head length. Head width half its length. Snout conic, length $\frac{2}{3}$ its width. Eye high, center about first third in head length. Mouth large, lower jaw slightly protruding. Maxillary to hind edge; expansion 3 in eye. Teeth conic, in narrow bands in jaws; enlarged outer row above and still larger inner row below, also outer front lower row of enlarged teeth; in front of upper jaw inside several rather long depressible conic teeth; bands of fine teeth in vomer and palatines, none on tongue. Front nostril at last $\frac{2}{5}$ in snout; hind nostril about midway between front one and eye. Interorbital very slightly convex, with slight median depression. Preopercle edge serrate, and 5 serrae radiate subequally at angle, and extend upward full extent, though gradually small and then minute; serrae largely absent on lower preopercle edge; median opercular spine much closer to lower and most backward; suprascapula with several spines.

Rakers III, 3+9, iv, lanceolate, equal filaments or $1 \frac{7}{8}$ in eye. Scales firm, ctenoid; basal radii 9; apical denticles about 50 to 60; circuli very fine; cheek scales in 10 rows. Fourth dorsal spine $2 \frac{1}{3}$ in head; third anal spine $4 \frac{2}{3}$; caudal $1 \frac{1}{3}$; pectoral $1 \frac{2}{3}$; ventral $1 \frac{2}{3}$. In alcohol faded dull brown generally. Length 170 mm. Rio Janeiro.

An example in the Academy from Rio Janeiro, 181 mm. long, varies as follows: Head $2 \frac{2}{3}$; depth $3 \frac{1}{2}$; scales 55 in lateral line to caudal base and 5 large ones on latter; third anal spine $4 \frac{1}{3}$ in head; caudal $1 \frac{1}{2}$; pectoral $1 \frac{3}{7}$; ventral $1 \frac{4}{5}$; snout $4 \frac{1}{3}$ in head from upper jaw tip; eye $5 \frac{1}{3}$; maxillary $2 \frac{1}{4}$; interorbital $7 \frac{1}{4}$; rakers iv, 2+9, III.

Pharopteryx nigricans Rüppell. *Faz-162a.*

Head $2 \frac{1}{2}$ to $2 \frac{3}{4}$; depth 3 to $3 \frac{1}{5}$; D. XI or XII, 7, i; A. III, 8, i; scales 18 in upper section of lateral line, 10 in lower section and 5 of which before end of last scale in upper section; 2 scales above lateral line to spinous dorsal origin, 9 below (upper section) to spinous anal origin; 8 predorsal scales; snout 5 in head from upper jaw tip; eye $3 \frac{1}{10}$ to $3 \frac{2}{5}$; maxillary 2 to $2 \frac{1}{10}$; interorbital 2 to $2 \frac{1}{2}$ in eye.

Head width 2 to $2 \frac{1}{5}$ in total head length. Snout conic, length $\frac{3}{5}$ its width. Eye large, impinging on upper profile. Mouth moderate, lower jaw slightly protruding or jaws even. Maxillary to hind eye edge; expansion $1 \frac{2}{5}$ to 2 in eye. Jaws vomer and palatines with bands of fine teeth; row of slightly enlarged outer upper jaw teeth and pair of smaller outer lower ones; bands of fine teeth on vomer and palatines; none on tongue. Interorbital nearly level. Preopercle entire, also suprascapula. Rakers III, 1+7, ii, lanceolate, long as filaments or 3 in eye. Head with cycloid scales, with about 23 radiating striae; body scales ctenoid, with 18 to 21 radiating striae, of which 10 to 12 basal; apical denticles 50 to 85; circuli very fine. First ventral ray reaches anal origin. In alcohol faded largely uniform dark brown. Length 59 to 70 mm.

(caudal damaged). Two examples. Fiji and Balabac Passage.

Four drawings, 1 labeled Balabac Passage and 2 from Fiji by Richard. Enoplosidae.

Enoplosus armatus (White). *Fiji-163 dr.*

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth $1 \frac{3}{4}$ to 2; D. VIII - I, 14, 1, or 15, 1; A. III, 14, 1 or 15, 1; scales 74 to 92 in lateral line to caudal base and 6 more on latter; tubes 51 to 66 in lateral line to caudal base and 5 or 6 more on latter; about 12 scales between fifth dorsal spine base and lateral line; 33 to 36 scales from anal origin to front of horizontal section of lateral line; about 30 predorsal scales to occiput;

snout $3\frac{2}{3}$ to $4\frac{1}{3}$ in head from upper jaw tip; eye $3\frac{2}{3}$; maxillary 3 to $3\frac{1}{10}$; interorbital $5\frac{1}{5}$ to 6.

Body strongly compressed, back elevated; predorsal with slight keel; least depth of caudal peduncle $\frac{7}{8}$ to 1 in its length or $2\frac{2}{5}$ to $2\frac{4}{5}$ in total head length. Head width $2\frac{2}{3}$ to $2\frac{3}{4}$ in its length; upper profile greatly concave. Snout length $\frac{7}{8}$ to 1 in its width. Hind eye edge midway in head length, little posterior in younger. Mouth moderate, mandible well protruded. Maxillary to or slightly beyond eye front; expansion 2 to $2\frac{1}{5}$ in eye. Teeth small, in bands in jaws, on vomer and palatines. Nostrils well separated, front one about last third in snout. Interorbital depressed, rising up with convex surface behind. Preorbital with 5 or 6 backward directed spines. along lower edge; preopercle edge denticulate, 2 large spines at angle, upper large and directed upward, suprascapula entire.

Rakers 6 to 8+17 or 18, lanceolate, $2\frac{1}{8}$ to $2\frac{1}{2}$ in eye; filaments $\frac{7}{8}$ to 1 in rakers. Scales cycloid, in slightly waved longitudinal rows; basal radiating marginal striae 7 to 12; circuli about 25 to 50; 10 rows of scales on cheek; 3 rows of scales at upper maxillary end; small scales form rather broad sheaths to spinous and rayed dorsal and anal; broad adnate scaly flap in pectoral axil; lateral line strongly arched in front little over half its length, tubes simple.

Fourth dorsal spine longest, enlarged, at least far back as tip of depressed spine in soft dorsal and longer than head; third anal spine $1 \frac{2}{3}$ to 2; pectoral $1 \frac{1}{6}$ to $1 \frac{1}{5}$; ventral spine $1 \frac{1}{2}$ to $1 \frac{4}{5}$; fin reaching about $\frac{2}{3}$ in depressed second anal spine.

Color in alcohol pale brown on upper surface generally, sides and lower surface whitish. On each side of head above narrow blackish-brown line from occiput forward to each side of snout, well separated by pale median space. From front predorsal region broad deep brown bands extend forward, includes hind half of eye, then curves back over side of cheek, though not extending below lower preopercle ridge. From spinous dorsal origin third wide deep brown band extends forward below, includes opercle and lower side of chest, very indistinctly united with its fellow below. From pectoral axil narrower short band of deep brown. Properly broad fourth band belongs at highest part of spinous dorsal, extends down vertically about midway in depressed ventral length. From soft dorsal origin to that of spinous anal narrow deep brown band. From ends of front elongate dorsal rays, after first, blackish band down vertically to middle of soft anal base, then likewise out on latter fin; though more brownish on trunk. On caudal peduncle 2 vertical deep brown saddles extend well down, though not uniting below, and front begins just after last dorsal ray

base, little narrower. Caudal pale or whitish, deep brown basally and along edges above and below. Pectoral whitish. Ventral dusky or chocolate-brown. Iris brassy, with dusky tints. Length 117 mm. (caudal damaged). Sydney. Also another in the Academy, included above, from Victoria, Australia, 167 mm. (caudal damaged). The colors given above are from the Victorian specimen, as the Sydney specimen is greatly discolored and darkened.

E. serotinus De Vis¹²² is described with seven dorsal spines in first dorsal and depth "rather more than twice into the length of the head and body." Its length is 163 mm.

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PSEUDOCROMIDAE.

Pseudochromis melanotaenia Bleeker.

Head $3 \frac{1}{5}$; depth 4; D. III, 21; A. II, 12; scales 20 in flat upper section of lateral line, 6 in lower horizontal section to caudal base and 2 more on latter; snout $4 \frac{1}{5}$ in head from upper jaw tip; eye $3 \frac{1}{4}$; maxillary 3; interorbital 2 in eye; head width $2 \frac{2}{5}$ in its total length. Snout conic, length $\frac{2}{3}$ its width. Eye much greater than snout, impinging on upper profile of head. Maxillary to eye center. Each of 6 forward teeth in jaws little enlarged. No hind canines. Interorbital convex. Rakers 2 10, lanceolate, weak, little less than filaments, which 2 in eye. Scales with 8 to 10 radiating basal striae; apical denticles about 30. Color in alcohol dark brown. Dorsals blackish-brown basally, contrasted with entire broad whitish margins of both fins. Caudal pale to whitish, with oblique blackish-brown streak from beginning of each lobe, sloping little medially behind to leave rather broad whitish borders at corners. Length 36 mm. Balabac Passage.

341

Priacanthidae.

Priacanthus arenatus Cuvier. *Fig. 163.*

Head 3; depth $2 \frac{3}{5}$; D. X, 15; A. III, 15, scales 102 in lateral line to caudal base and 6 more on latter; tubes 69 in lateral line to caudal base and 4 more on latter; about 20 scales above lateral line to spinous dorsal origin, 10 above to fourth dorsal spine base, 34 below to anal origin; 75 predorsal scales; snout $3 \frac{2}{5}$ in head from upper jaw tip; eye $2 \frac{1}{3}$; maxillary $1 \frac{7}{8}$; interorbital $3 \frac{2}{5}$.

122

Ann. Queensland Mus., No. 10, Nov. 1911, p. 29. Cairns.

Body elongately ellipsoid, well compressed; least depth of caudal peduncle $1\frac{1}{2}$ its length or $3\frac{3}{4}$ in total head length. Head width $1\frac{7}{8}$ its length. Snout broadly convex, length $\frac{3}{5}$ its width. Eye midway in head. Maxillary to pupil, expansion half of eye. Teeth small, conic, in narrow bands in jaws, in vomer and front of palatines, none on tongue. Hind nostril long vertical slit, length 3 in eye; front nostril at first third in snout. Preopercle edge entirely denticulate; strong flat spine at angle, its edge also denticulate.

Rakers $7+23$, lanceolate; $2\frac{1}{4}$ in eye; filaments about $\frac{2}{3}$ of rakers. Scales firmly adherent; 5 basal lobes; circuli about 50 to 52; widely obtuse subapical asperous triangular area; 16 rows of cheek scales. Sixth dorsal spine $2\frac{1}{4}$ in head; second anal spine $2\frac{2}{3}$; pectoral 2; ventral $1\frac{1}{6}$. In alcohol dull uniform dull brownish. Inner ventral rays deeper brown. Iris dull yellowish. Length 163 mm. (caudal damaged). Rio Janeiro.

Compared with an example in the Academy, 207 mm. long, from same locality which differs in D. rays 14; A. rays 17 (several abnormal); scales about 114 in lateral line to caudal base and 9 more on latter; 79 tubes in lateral line to caudal base and 4 more on latter; 19 scales above lateral line to spinous dorsal origin; 35 scales below lateral line to anal origin; eye slightly larger; scales with 3 or 4 basal lobes;

ventral membranes much paler.

Priacanthus ~~pecki~~ ~~leodinae~~ macracanthus Cuvier. Fig. 1164.

Head 3 to $3\frac{1}{4}$; depth $2\frac{2}{3}$ to 3; D. X, 14; A. III, 15; scales 120 to 127 in lateral line to caudal base and 7 or 8 more on latter; tubes 70 to 77 in lateral line to caudal base and 5 or 6 more on latter; 22 to 24 scales above lateral line to spinous dorsal origin, 12 to 14 to third dorsal spine base, 42 to 45 below to spinous anal origin; 78 to 80 predorsal scales; snout $3\frac{1}{5}$ to $3\frac{2}{5}$ in head from upper jaw tip; eye $2\frac{1}{5}$ to $2\frac{1}{2}$; maxillary $1\frac{4}{5}$ to 2; interorbital $3\frac{2}{5}$ to 4.

Body elongately ellipsoid, well compressed, least depth of caudal peduncle $1\frac{1}{4}$ to $1\frac{2}{3}$ its length or 4 in total head length. Head width $1\frac{7}{8}$ to $2\frac{1}{8}$ in its length. Snout broadly convex, length $\frac{3}{5}$ to $\frac{2}{3}$ its width. Eye center very slightly behind center in head length; midway in head length, without mandible in smaller examples. Mouth large, mandible strongly protruding. Maxillary to pupil; expansion $1\frac{7}{8}$ to 2 in eye. Teeth conic, simple, in narrow bands in jaws, on vomer and palatines, none on tongue. Hind nostril long vertical slit about 3 in eye; front nostril little behind last third in snout. Interorbital broadly convex; preorbital edge finely serrate; preopercle edge serrate, and serrae coarser to short flat spine at angle, which also with several serrae along its edges.

Rakers $8+24$ to 26, lanceolate, 2 to $2\frac{1}{3}$ in eye; filaments $\frac{3}{4}$ of rakers; Scales finely adherent; 4 or 5 basal lobes; circuli about 80 to 85; apical asperous triangular area widely triangular; about 15 to 18 apical denticles; 24 rows of scales on cheek. Sixth dorsal spine $2\frac{1}{10}$ to $2\frac{1}{4}$ in head; tenth dorsal spine $1\frac{2}{3}$ to 2; third anal spine $1\frac{3}{4}$ to $2\frac{1}{8}$; upper caudal lobe $1\frac{1}{6}$ to $1\frac{2}{5}$; pectoral $1\frac{2}{3}$ to 2; ventral 1 to $1\frac{7}{8}$. In alcohol uniform dull brownish. Ventral membranes largely dusky, deeper terminally and front edges of rays all whitish. Anal with dusky membranes, rays largely with whitish edges. Edges of spinous dorsal membranes with slight dusky tint. Length 150 to 230 mm. Four Hawaiian examples, one likely from Maui?

A Hawaiian example 278mm. in the Academy shows: Head $3\frac{1}{8}$; depth $2\frac{3}{4}$; D. X, 14; A. III, 15; scales 123 in lateral line to caudal base and 6 more on latter; tubes in lateral line 75 to caudal base and 4 more on latter; 24 scales above lateral line to spinous dorsal origin; 12 to fifth dorsal spine base; 46 below to spinous anal origin; snout $3\frac{1}{10}$ in head from upper jaw tip; eye $2\frac{1}{2}$; maxillary $1\frac{7}{8}$; interorbital $3\frac{1}{2}$; rakers $6+24$.

Besides Richard's drawing of an example from Maui, also 2 drawings by W. H. Douglas of which one a young example labelled Tahiti. Both show 14 soft dorsal rays.

Pempheridae.

345

Pempheris compressus (White).

Head $3 \frac{1}{5}$; depth 2; D. VI, 10; A. III, 34; scales 60 in lateral line to caudal base and 11 above and 26 below; snout 4 in head from upper jaw tip; eye $2 \frac{1}{4}$; maxillary $1 \frac{2}{3}$; interorbital $3 \frac{1}{4}$.

Body deeply ovoid. Head width half its length. Snout convex, length $\frac{2}{5}$ its width. Eye very large, rounded, hind

pupil edge about midway in head. Mouth very oblique, mandible slightly protruding. Maxillary to eye center; expansion $2 \frac{1}{2}$ in eye. Nostrils together, close before middle in front eye edge. Interorbital convex. Preopercle edge with 2 blunt serrae above and 2 or 3 below, short spine at corner; interopercle radiately-striate; infraopercle smooth, entire; gill rakers 11 + 24, lanceolate, nearly twice filaments or $2 \frac{1}{8}$ in eye. Scales adherent, ctenoid; basal striae 10 to 16; apical serrae about 16 or 17; head scaled; cheek with 10 rows of scales; anal and caudal basally covered with fine scales. Fins mostly damaged; pectoral $1 \frac{1}{3}$ in head; ventral 2. In alcohol largely dull brown, mostly uniform. Length 107 mm. (caudal damaged).
Sidney.


Liopempheris multiradiata (Klunzinger).

Fig. 142.

Drawing of example from Sydney, New South Wales, by W. H. Dall.

Lutjanidae.Lutjanus kasmira (Forsk.) *Fig. 165.*

Head $2 \frac{3}{5}$; depth $2 \frac{3}{4}$; D. X, 14, 1; A. III, 8, 1; scales 79 in lateral line to caudal base and 12 more on latter; tubes 49 in lateral line to caudal base and 4 more on latter; 8 scales above lateral line to spinous dorsal origin, same to soft dorsal origin, 19 below to spinous anal origin; 38 predorsal scales, to front of eyes; snout $3 \frac{1}{8}$ in head; eye $3 \frac{4}{5}$; maxillary $2 \frac{2}{5}$; interorbital 5.

Body ellipsoid, compressed, least depth of caudal peduncle equals length or $\frac{3}{4}$ in head. Head width half its length. Snout conic, long as wide. Eye large, hind pupil edge midway in head length. Mouth moderate, lower jaw slightly included. Maxillary to pupil; expansion $2 \frac{1}{2}$ in eye. Teeth conic, simple, in narrow bands in jaws; on vomer  shaped band; each palatine with band of fine teeth; outer jaw teeth as slightly enlarged row; tongue smooth. Front nostril small pore about first $\frac{2}{5}$ in snout; hind one oblique slit 4 times as large, midway between it and eye. Interorbital convex. Preopercle edge serrate, gash just above angle receiving bony knob and spines immediately below largest; single opercular spine; suprascapula entire.

Rakers 6+10, iv, lanceolate, $2 \frac{1}{4}$ in eye or $\frac{3}{4}$ of filaments. Scales in nearly horizontal rows, slightly oblique rows above lateral line anteriorly; finely ctenoid, apical denticles 66 to 80; basal striae 9 to 13; circuli fine; 12 rows of scales on cheek; lateral line concurrent with dorsal profile tubes usually with 3 branches. Fourth dorsal spine $2 \frac{7}{8}$ in head;

second anal spine $2 \frac{1}{3}$; first anal ray $2 \frac{2}{5}$; caudal $1 \frac{1}{2}$; emarginate; pectoral $1 \frac{1}{3}$; ventral $1 \frac{2}{3}$. In alcohol pale brown, lighter below. Five horizontal narrow white streaks or lines, edges of each narrowly darker and third crosses lateral line below ^{front of} soft dorsal. Length 163 mm. Fiji.

Lutjanus marginatus (Cuvier). *Fig. 166-*

Head $2 \frac{1}{2}$ t $2 \frac{3}{5}$; depth $2 \frac{3}{5}$ to $2 \frac{3}{4}$; D. \times , 14; A. III, 8; scales 80 to 90 in lateral line to caudal base and 9 or 10 on latter; tubes 45 to 48 in lateral line to caudal base and 7 or 8 more on latter; 7 to 9 scales above lateral line to spinous dorsal origin, 15 or 16 below to spinous anal origin; 19 to 25 predorsal scales, to hind pupil edge, 15 in young; snout $2 \frac{7}{8}$ to 3 in head, $3 \frac{1}{6}$ in young; eye $3 \frac{3}{4}$ to $4 \frac{1}{3}$, 3 in young; maxillary $2 \frac{2}{5}$ to $2 \frac{3}{5}$; interorbital $4 \frac{4}{5}$ to $5 \frac{2}{3}$.

Body ellipsoid, well compressed; caudal peduncle deep as long, least depth 3 to $3 \frac{1}{8}$ in head. Head width 2 to $2 \frac{1}{4}$ in its length. Snout conic, length $\frac{7}{8}$ its width. Eye ellipsoid, high, hind pupil edge midway in head length. Mouth and teeth as in L. kasmira, except single, double or even treble canines in front above. Maxillary to eye, though not quite to pupil; expansion 2 to $2 \frac{1}{2}$ in eye. Front nostril small pore about first third in snout, midway in young; similar hind one slightly before last third, about last fourth in young. Interorbital nearly level. Propercle and opercle ^{ular} spine as in L. kasmira¹; suprascapula serrate, serrae large in young.

¹ Mem. Mus. Comp. Zool., vol. 26, 1911, p. 287, Pl. 4, fig. 1.
Makimo, Ponmotu.

Rakers iv or v, 1 7 or 8, iv or v, lanceolate, $2\frac{1}{2}$ to $2\frac{2}{3}$ in eye or about equal filaments. Scales in oblique rows above lateral line, in horizontal rows below, finely ctenoid; basal striae 13 to 15, some low as 5; apical denticles 76 to 88; circuli fine; 6 or 7 rows of scales on cheek, but few below preopercle ridge; lateral line concurrent with dorsal profile, tubes usually simple. Fourth dorsal spine $2\frac{3}{5}$ to 3 in head; second anal spine $2\frac{1}{6}$ to $3\frac{1}{8}$; lineate caudal $1\frac{1}{3}$ to $1\frac{2}{5}$; pectoral $1\frac{1}{5}$ to $1\frac{3}{5}$; ventral $1\frac{2}{5}$ to $1\frac{3}{4}$. In alcohol largely dull and brownish below, and lower sides of head much paler or with whitish tints. Fins pale brown, dorsal edges dusky and hind caudal edge very narrowly whitish. Length 87 to 235 mm. Two from Fiji and one from Samoa. We also include a Samoan

example in the Academy 180 mm. long. *Drawing by Richard of example from Fiji and one from Pohnpei.*

Lutianus marginatoides Kendall and Goldsborough is undoubtedly synonymous. We examined a Thornton Island example in the Academy, 273 mm. long, and its eye is about $1\frac{3}{5}$ in snout, the orbital socket of course much larger. The eye is larger in the

small examples, described above, or about $1\frac{1}{3}$ in snout. We cannot in any way see that it has a smaller mouth. In our young Samoan example the dark border on dorsals broader than in adults.

Lutjanus semicinctus Day and Gannard.

A sketch of this species, 1290 mm. long from Lebusen, Fiji, made by J. Draughton June 1840. It is described with the following items. Head greenish black above, cheeks and opercle vermillion. Upper lip black. Maxillary orange yellow. Lower lip bright yellow. Lower surface of head white, branchiostegals flesh white. Iris, ^{claret brown} with white streaks. Back yellowish green with 7 purple brown transverse bands. Lower half of trunk and tail vermillion. Large black blotch at caudal base and on caudal peduncle. Spinous dorsal yellowish orange, edge vermillion. Soft dorsal bright yellow, orange basally. Soft anal bright yellow, vermillion basally. Caudal, except as noted bright orange yellow. Pectoral with vermillion streak basally, end of fin orange.

Theraponidae.
~~Macropodus~~

Therapon jarbua (Forsk^oal).

Head $2 \frac{7}{8}$ to $3 \frac{1}{4}$; depth $2 \frac{2}{3}$ to $3 \frac{1}{4}$; D. XI, I, 10, 1; A. III, 8, 1; scales 80 to 85 in lateral line to caudal base and 8 to 10 more on latter; 16 or 17 scales above lateral line to spinous dorsal origin, 13 or 14 scales above to soft dorsal origin, 22 to 28 below to anal origin; 22 to 26 predorsal scales; snout 3 to $3 \frac{2}{5}$ in head from upper jaw tip; eye 4 to $4 \frac{1}{3}$; maxillary $2 \frac{1}{2}$ to $2 \frac{3}{5}$; interorbital $3 \frac{1}{4}$ to $3 \frac{1}{2}$.

Body elongately fusiform, well compressed; least depth of caudal peduncle $\frac{4}{5}$ to 1 in its length or $2 \frac{3}{5}$ to 3 in total head length. Head width $1 \frac{3}{4}$ to $1 \frac{7}{8}$ its length; upper profile with obtuse angle above front nostril. Snout length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Hind eye edge about midway in head, slightly posterior in young. Mouth little inclined closed jaws about even or lower very slightly protrudes. Maxillary little beyond front of pupil or scarcely to center, slightly shorter in young; expansion 2 in eye. Bands of small pointed teeth in jaws, wide in front, and outer row of strong uniform conic teeth; short transverse band of small vomerine teeth, none on palatines. Nostrils large, front one about last $\frac{2}{5}$ in snout; hind one about twice as large, midway between front one and eye. Interorbital flat. Preorbital edge denticulate; preopercle edge and denticles largest at angle, decrease in size above and forward; opercular spine nearly long as eye; shoulder girdle edge above pectoral with 5 or 6 spines;

suprascapula with few denticles.

Rakers 6 13 or 14, lanceolate, $3/5$ of filaments, which about $3/5$ of eye. Scales ctenoid, smaller and crowded on predorsal and about gill-opening; 8 or 9 basal striae, often 3 or 4 more imperfect ones with age; apical denticles 22 to 25; circuli fine; 9 or 10 rows of cheek scales; low scaly sheaths along dorsal and caudal bases; caudal largely covered with minute scales; lateral line concurrent with dorsal profile, tubes little exposed and on little scales. Fourth dorsal spine $1 \frac{2}{3}$ to $1 \frac{5}{6}$ in head; first dorsal ray 2 to $2 \frac{1}{4}$; third anal spine $2 \frac{7}{8}$ to $2 \frac{1}{2}$; first anal ray $1 \frac{7}{8}$ to 2; upper caudal lobe $1 \frac{1}{8}$ to $1 \frac{1}{6}$; pectoral $1 \frac{2}{3}$ to $1 \frac{4}{5}$; ventral $1 \frac{2}{5}$ to $1 \frac{1}{2}$. After long immersion on alcohol the colors fade to nearly uniform dull brown, only the lower portions paler. Length 127 to 245 mm. Fiji and Samoa, and one labeled Hawaiian Islands, doubtless erroneously. We also include examples in the Academy from the Philippines and Sumatra.

Color of Sumatran examples, when fresh in arrack, silvery, upper parts pale brown and lower white. Just below dorsal broad deep brown bands on side of back, another from nape along caudal peduncle above where joining former, then continued out on caudal to its edge. Two indistinct or ill-defined bands from opercle along middle and lower part of sides; first persists out across middle of caudal to its edge and other out over lower caudal lobe also to its edge. Dorsal and anal whitish, spinous part of former with upper $2/3$ of fin with 2 large deep brown blotches

and soft part with smaller evenly distributed marginal edges. Tips of caudal lobes with deep brown blotch, lower not marginal. Pectoral dusky. Ventral tinted yellowish. Peritoneum silvery.

Haemulidae.

Anisotremus scapularis (Tschudi).

Head $2 \frac{7}{8}$ to 3; depth $2 \frac{1}{5}$ to $2 \frac{1}{4}$; D. XI, I, 1, 11, 1 or 1, 15, 1; A. III, 1, 12, 1 or 13, 1; scales 62 to 71 along lateral line to caudal base and 7 to 9 more on latter; tubes 52 to 55 in lateral line to caudal base and 6 to 10 more on latter; 14 scales above lateral line to spinous dorsal origin; 10 to 12 above to base of first dorsal ray, 19 below to spinous anal origin; 48 to 55 predorsal scales; snout $3 \frac{1}{5}$ to $3 \frac{2}{5}$ in head; eye $3 \frac{3}{4}$ to $4 \frac{1}{8}$; maxillary $3 \frac{1}{8}$ to $3 \frac{1}{4}$; inter-orbital 3 to $3 \frac{1}{4}$.

Body deeply ovoid, back elevated forward, strongly compressed; least depth of caudal peduncle about $1 \frac{1}{4}$ to $1 \frac{1}{3}$ its length or $2 \frac{4}{5}$ to $3 \frac{1}{8}$ in head. Head width $1 \frac{9}{10}$ to 2 in its length. Snout obtuse, convex, length $\frac{3}{4}$ to $\frac{7}{8}$ its width. Eye advanced before middle in head, or center about first third in head length; hind eye edge about midway in smaller example. Mouth small, low, lower jaw included. Maxillary little beyond front eye edge, not quite to pupil; expansion $2 \frac{1}{2}$ to $2 \frac{3}{4}$ in eye. Teeth simple, conic, slightly curved, in broad bands in jaws,

outer row enlarged, especially in front; no other teeth. Two pairs of pores on chin, hind pair much closer, or as single pore in smaller example. Front nostril twice size of hind one, which close behind and former about last fifth in snout length. Interorbital convex. Hind preopercle edge denticulate; suprascapula entire.

Rakers 11 or 12 12 or 13, lanceolate, $1\frac{1}{2}$ to $1\frac{3}{4}$ in filaments, which $1\frac{1}{2}$ to $1\frac{4}{5}$ in eye. Scales ctenoid, in oblique rows above lateral line until below soft dorsal, then in longitudinal rows parallel; below lateral line in slightly oblique rows anteriorly, and parallel or longitudinal rows posteriorly; 7 or 7 radiating striae, less developed or with 3 to 7, though lower number often with several incomplete auxiliaries; apical denticles 43 to 54, or 27 to 36 in younger example; circuli fine; 15 or 16 scales across cheek to preopercle angle; muzzle naked; scales all smaller on body edges; breast and rayed vertical fins; lateral line concurrent with dorsal profile, tubes each with several short branches. Fourth dorsal spine $2\frac{1}{5}$ to $2\frac{1}{3}$ in head; second branched dorsal ray 2 to $2\frac{1}{4}$; second anal spine $2\frac{1}{4}$ to $2\frac{4}{5}$; first branched anal ray 2 to $2\frac{1}{10}$; upper caudal lobe $1\frac{1}{4}$? to $1\frac{1}{3}$, emarginate; pectoral 1; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Color in alcohol dull umber-brown generally, not paler below. Sides with brassy or silvery reflections, only under surface of head pale brownish ; pectoral axil and both above and below small blackish blotch; ventral axil pale, though fin basally rather deep brownish. Smaller example with dusky blotch at last dorsal and anal rays. Length 180 to 220 mm. Two from Peru.

Although we have no material for comparison, the great variation exhibited by the above examples suggests that Conodon pacifici Gunther is synonymous. This would follow from the distinctions set forth by Evermann and Radcliffe¹²³ For A. pacifici they give 14 dorsal rays, 10 anal rays and scales in lateral line 46 to 48; for A. scapularis is given 15 to 17 dorsal rays, 13 anal rays and 58 to 62 scales. Their figure shows¹²⁴ a greatly reduced squamation on the cheek in comparison with our examples.

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Bull. U.S.Nat.Mus., no.95, 1917, p. 80.

124

L.c., Pl.8, fig.1.

Haemulon steindachneri (Jordan and Gilbert). *Fig. 167*

Head $2 \frac{2}{3}$; depth $2 \frac{1}{2}$; D. XII, 1, 15; A. III, 8, 1; scales 54 along lateral line to caudal base and 10 more on latter; tubes 50 in lateral line to caudal base and 9 more on latter; 8 scales above lateral line to spinous dorsal origin; 7 above to soft dorsal origin; 14 below to spinous anal origin; about 40 predorsal scales; snout $1 \frac{2}{3}$ in head; eye 4; maxillary $1 \frac{5}{6}$; interorbital $3 \frac{1}{2}$.

Body elongate ovoid, compressed; least depth of caudal peduncle $1 \frac{1}{4}$ its length or $3 \frac{2}{3}$ in head. Head width $2 \frac{1}{10}$ its length. Snout conic, long as wide. Eye little ellipsoid, about midway in head length. Mouth moderate, jaws even. Maxillary extends $\frac{3}{5}$ in eye; expansion $2 \frac{1}{8}$. Bands of fine conic teeth in at least front half of each jaw, with outer series of larger conic ones all around and continued back; front upper teeth almost twice size of lower; no others. Nostrils together, a ike; front one at last fourth in snout. Interorbital convex. Hind preopercle edge with short serrae, inconspicuous, crowded about median region, more wide-spread around angle, none below. Greatest preorbital width trifle more than eye; suprascapular edge entire.

Rakers 9+12, III, lanceolate, $1 \frac{2}{3}$ in filaments, which $1 \frac{7}{8}$ in eye. Scales finely ctenoid; rows oblique above lateral line and below anteriorly though become longitudinal posteriorly;

basal striae 9 to 12; apical denticles 55 to 62; circuli fine; soft vertical fins densely scaled; 16 scales across cheek; lateral line nearly concurrent with dorsal profile, short tubes usually with short branch. Fourth dorsal spine $2 \frac{2}{5}$ in head; third dorsal ray 3; second anal spine $2 \frac{3}{5}$; second anal ray $2 \frac{1}{3}$; caudal $1 \frac{1}{2}$; pectoral $1 \frac{1}{6}$; ventral $1 \frac{3}{5}$.

Color in alcohol dull olive-brown, paler below. Fins dull brown. Each row of scales with longitudinal paler line, made up of paler or slightly yellowish spot on each scale, and lines all following courses of scales. Length 215 mm. One without locality, likely from Rio Janeiro?

Conodon nobilis (Linnaeus).

Head $3 \frac{1}{5}$; depth $2 \frac{7}{8}$; D. XI, I, 13 1; A. III, 7, 1; tubular scales in lateral line 51 to caudal base and 7 more on latter; 7 scales above lateral line to dorsal origin, 13 below to spinous anal origin; 34 predorsal scales; snout $3 \frac{2}{3}$ in head from upper jaw tip; eye $3 \frac{3}{4}$; maxillary 3; inter-orbital $3 \frac{4}{5}$.

Body elongately ellipsoid, well compressed; least depth of caudal peduncle $\frac{4}{5}$ its length or $2 \frac{7}{8}$ in total head length. Head width $1 \frac{9}{10}$ its length. Snout conic, length $\frac{2}{4}$ its width. Eye close to upper profile, hind edge midway in head. Mouth small, lower jaw slightly protruding. Maxillary extends little beyond eye front, but not to pupil; expansion $2 \frac{2}{5}$ in eye. Narrow bands of very small conic teeth in jaws, with outer row of larger well spaced conic ones,

several of each anterior well developed canines; no other teeth.. Nostrils together, front one at last fourth in snout; Interorbital level. Preopercle edge and supra-scapula denticulate, with spines at angle largest, and become smaller above and below but latter deflected forward.

Rakers 7+14, largest equals filaments or half of eye. Scales with 7 to 12 basal striae; apical denticles 43 or 43; circuli very fine; 17 rows of scales across cheek; tubes in lateral line simple, concurrent with dorsal profile. Fourth dorsal spine $1 \frac{3}{5}$ in head; second anal spine $1 \frac{1}{2}$; pectoral $1 \frac{1}{3}$; ventral $1 \frac{2}{5}$.

Color in alcohol dull olive on back, sides and below paler with bright silvery-white reflections. Faint traces of 8 vertical dark streaks on back and upper sides. Fins pale brownish. Length 145 mm. (caudal damaged). Rio Janeiro. Agrees with slightly larger examples in the Academy, from Trinidad.

Orthopristis Girard.

Subgenus Orthopristis Girard.

Orthopristis ruber (Cuvier).

Fig. 169.

Head $2 \frac{7}{8}$; depth $2 \frac{1}{2}$; D. XII, 15 1; A. III, 11, 1;

scales 53 in lateral line to caudal base and 5 more on latter; 10 scales above lateral line to spinous dorsal origin, 9 to soft dorsal origin, 16 below to spinous anal origin; 40 predorsal scales; snout $2 \frac{3}{4}$ in head; eye $4 \frac{1}{4}$; maxillary $3 \frac{3}{5}$; interorbital 4; rakers 12 13. Scales with 8

to 10 basal striae; apical denticles 50 to 60; circuli moderately fine. Color in alcohol uniform dull brownish generally, little paler below. Length 178 mm. Rio Janeiro.

O. scapularis Fowler¹²⁵ is a synonym. The dark scapular blotch, so conspicuous in the fresh fish, fades with long immersion in spirits. A comparison of the type, in the Academy, with the above example, besides other Academy examples from Rio Janeiro and Colon, 162 to 170 mm., long, shows all in agreement. The older specimens have faded pale and are without markings.

O. kendalli Fowler¹²⁶ may represent the young, and thus be simply an accidental straggler to Rhode Island, where it was obtained many years ago. It shows several characters which do not appear conclusive to us as characters of immaturity. The scales above the lateral line are in rows longitudinally parallel with the same its entire course and in greatly reduced numbers as compared with O. ruber. The scales of O. kendalli show 7 to 9 radiating basal striae, and 27 or 28 apical denticles.

O. poeyi (Scudder) Poey¹²⁷ we have not seen, and though it is described with different coloration most of its structural characters are within the limits of variation for O. ruber. It however, seems to be founded on a more slender individual, the depth $3\frac{1}{4}$ according to Jordan and Fesler.

125 Proc. Acad. Nat. Sci. Phila., 1915, p. 536, fig. 4

126 Proc. Boston Soc. Nat. Hist., vol. 35, 1917, p. 126, fig. 5.

127 Synopsis, 1868, p. 312, Havana.

Subgenus Lepthamulus Fowler and Bean.

Proc. U. S. Nat. Mus., 63, 1923, p. 14. Type
Orthopristis rhabdotus Fowler and Bean, orthotypic.

Orthopristis rhabdotus Fowler and Bean.

Orthopristis rhabdotus Fowler and Bean,

l.c. Peru?

Pomadasis therapon (Bleeker).

Head 3; depth $2 \frac{5}{6}$; D. XI, I, 14, 1; A. III, 7, 1; scales 50 in lateral line to caudal base and 9 more on latter; 7 scales above lateral line to spinous dorsal origin, 5 above to first soft ray base, 12 below to spinous anal origin; about 30 predorsal scales; snout 3 in head; eye $3 \frac{2}{3}$; maxillary $3 \frac{1}{10}$; interorbital 4.

Body compressed, rather oblong-ovate; least depth of caudal peduncle $1 \frac{1}{5}$ its length or 3 in head. Head width $1 \frac{7}{8}$ its length. Snout convex, length $\frac{7}{8}$ its width. Eye elevated, little ellipsoid, hind pupil edge about midway in head length. Mouth small, low, mandible included.

Maxillary to eye; expansion $3 \frac{2}{5}$ in eye. Teeth conic, in bands in jaws, outer row little enlarged; in others. Nostrils close, from one about last third in snout and twice second. Interorbital convex; largely depressed medianly. Hind preopercle edge denticulate, lower entire; suprascapula denticulate.

Rakers 6+12, short, lanceolate, half of filaments, which $1 \frac{3}{4}$ in eye. Scales in longitudinal rows; basal radiating striae 7 to 9; apical denticles 46 to 55; circuli very fine; basal scaly sheaths along dorsals and anals, broader on latter; caudal finely scaled over greater basal portion; 6 to 8 scales on cheek to preopercle ridge; lateral line concurrent with dorsal profiles and tubes simple.

Fourth dorsal spine $1 \frac{3}{5}$ in head; second dorsal ray $2 \frac{1}{4}$; second anal spine 2; first dorsal ray $2 \frac{1}{4}$; upper caudal lobe $1 \frac{1}{4}$; pectoral $1 \frac{1}{10}$; ventral $1 \frac{1}{3}$.

Color in alcohol dull brown generally, much paler below and most everywhere silvery-white sheen or reflections, also same along sides of larger spines. Large dusky brown blotch on spinous dorsal between fourth to seventh spines, fins otherwise dull brown. Iris yellowish-brown. Length 133 mm. Manila.

Isacia conceptionis (Cuvier).

7-27-69 -

Head $3 \frac{1}{10}$ to $3 \frac{1}{5}$; depth 3 to $3 \frac{1}{5}$; D. XIII, 14; A. III, 13; scales along and above lateral line to caudal base 73 to 80 and about 10 to 12 larger ones on latter; 48? to 54 tubes in lateral line to caudal base and 6 or 7 more on latter; 10 or 11 scales above lateral line to spinous dorsal origin and about same above to soft dorsal origin, 16 or 17? below to spinous anal origin; about 55 to 60 predorsal scales; snout $3 \frac{1}{3}$ to $3 \frac{3}{4}$ in head; from upper jaw tip; eye $4 \frac{3}{4}$ to 5; maxillary $3 \frac{1}{6}$ to $3 \frac{1}{3}$; interorbital $3 \frac{1}{8}$ to $3 \frac{1}{6}$.

Body elongately ovoid, compressed; least depth of caudal peduncle $1 \frac{3}{4}$ to $1 \frac{4}{5}$ its length or $3 \frac{1}{2}$ to $3 \frac{2}{3}$ in total head length. Head width half its length. Snout conic, length $\frac{5}{6}$ to 1 in its width. Eye circular, but

slightly elevated and hind edge midway in head length. Mouth moderate, lower jaw slightly protruding. Maxillary to hind nostril; expansion $2 \frac{1}{8}$ to $2 \frac{1}{4}$ in eye. Teeth small, fine, in narrow bands in jaws; no others. Nostrils together; front one larger, about last third in snout. Interorbital convex. Hind preorbital rough or obscurely denticulate. Rakers 12 or 13 20 to 23, lanceolate, $1 \frac{1}{6}$ to $1 \frac{1}{4}$ in filaments, which 1 to $1 \frac{1}{6}$ in eye. Scales firmly adherent, finely ctenoid; basal striae 6 to 9, apical denticles 43 to 50; circuli very fine; oblique rows of scales above lateral line, in horizontal rows below; 16 to 18 rows entirely across cheek; lateral line concurrent with dorsal profile, midway along caudal peduncle side, and simple tubes well exposed. Fourth dorsal spine $2 \frac{1}{6}$ in head; second dorsal ray 3 to $3 \frac{3}{5}$; third anal spine $4 \frac{3}{4}$ to $4 \frac{4}{5}$; second anal ray $3 \frac{1}{3}$; pectoral $1 \frac{1}{10}$ to $1 \frac{1}{6}$; ventral $1 \frac{3}{4}$. In alcohol dull brown, paler below, with brassy reflections. Fins dull brown. Length 218 to 227 mm. One from Valparaiso and another without data, doubtless from ~~Chili~~ Peru.

Plectorhinchus polytaenia (Bleeker)

Head $3 \frac{1}{4}$; depth $2 \frac{3}{4}$; D. XII, 22; A. III, 7, 1; scales about 96 in lateral line to caudal base and 16 more on latter; 15 scales above lateral line to spinous dorsal origin; 13 to soft dorsal origin; 20 below to spinous

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If 3 drawings by Richard me from Valparaiso and Peru.
two from Peru.

anal origin; about 57 predorsal scales; snout $2\frac{1}{4}$ in head; eye $4\frac{1}{8}$; maxillary $2\frac{2}{3}$; interorbital $3\frac{1}{2}$.

Body oblong, evidently moderately compressed; least depth of caudal peduncle $1\frac{1}{5}$ its length or $2\frac{1}{3}$ in head. Head width $2\frac{1}{10}$ its length. Snout with slightly concave profile, width $1\frac{1}{5}$ its length. Eye ellipsoid, elevated; front pupil edge about midway in head length. Mouth moderate, lower jaw apparently little shorter. Lips thick, tough. Maxillary about reaches eye; expansion $1\frac{7}{8}$ in eye. Teeth conic, in bands in jaws, outer row moderately enlarged; none elsewhere. Nostrils small, front one little before last fifth in snout; hind one nearer front one than eye. Interorbital convex. Hind preopercle edge finely serrate; suprascapula entire. (Rakers extracted) Scales finely ctenoid; basal striae 3 to 5; apical denticles 55 to 62; circuli very fine; 13 rows of scales across cheek to preopercle ridge; fine scales on bases of most fins, breast and chest; lateral line concurrent with dorsal profile. Third dorsal spine $2\frac{1}{3}$ in head; seventeenth dorsal ray $2\frac{2}{3}$; second anal spine $2\frac{1}{5}$; third anal ray $2\frac{1}{8}$; caudal $1\frac{1}{4}$; pectoral $1\frac{1}{2}$; ventral $1\frac{2}{5}$.

Color in alcohol brownish generally, nine longitudinal narrow white bands, margined above and below with deeper brown than body-color. On head line across interorbital evidently represents 2 continued from behind eye and 3 below extending across

cheek, all continuous over snout. Fins all dull brownish. Length 323 mm. (fish skinned out) Sulu.

Plectorhinchus chaetodontoides Lacépède.

Head $2\frac{3}{4}$?; D. XII, 18 1; A. III, 8; scales 60 in lateral line to caudal base and 12? more on latter; tubes 53 in lateral line to caudal base and 10 more on latter; 14 scales above lateral line to spinous dorsal origin, also same to soft dorsal origin; about 82 predorsal scales; snout $2\frac{1}{10}$ in head from upper jaw tip; eye $4\frac{1}{3}$; maxillary $2\frac{3}{4}$; interorbital $3\frac{2}{5}$.

Body evidently oblong; compressed; least depth of caudal peduncle $1\frac{1}{4}$ its length or $2\frac{3}{4}$ in total head. Head width $2\frac{1}{4}$ in its length. Snout compressed, width $1\frac{1}{3}$ its length. Eye elevated, front pupil edge midway in head from snout tip. Mouth moderate, lower jaw protruding. Lips broad, thick, coriaceous. Maxillary to hind nostril; expansion $1\frac{1}{3}$ in eye. Bands of small conic teeth in jaws, soon narrowing backwards; outer row of strong even conic teeth in each jaw; no other teeth. Nostrils small, alike; front ones about last fourth in snout; hind one close behind front one. Interorbital convex. Hind preopercle edge finely dentate, serrae all obliquely upward and backward, few scattered obsolete ones around corner. (Rakers extracted.) Scales ctenoid, without accessory or basal scales; radiating basal striae 4 to 6; apical denticles 62 to 78; circuli extremely fine; 15 rows of scales

across cheek to preopercle ridge; except spinous dorsal fine scales more or less over fins basally; scales small on most of head and breast; lateral line largely concurrent with dorsal profile, slopes down obliquely along caudal peduncle side to caudal base medially. Third dorsal spine $2 \frac{1}{6}$ in head; seventh dorsal ray 2; third anal spine $2 \frac{1}{4}$; second anal ray $1 \frac{2}{3}$; caudal $1 \frac{1}{10}$; pectoral $1 \frac{1}{5}$; ventral $1 \frac{1}{3}$.

Color in alcohol dull umber-brown, scarcely paler below, marked everywhere with rounded deeper brownish spots, most all little less than pupil. Sides and lower surface of head, and trunk with dull gamboge tint on many scales. Except uniformly dull brown pectoral and ventral dark spots extend over all other fins, where more crowded and pronounced. Only lower surface of head, breast and abdomen somewhat uniform. Lips muddy-brown. Iris dull straw-color. Spinous dorsal edged dusky. Length 337 mm. (fish skinned out). Sulu.

It differs a little from Bleeker's figure¹²⁸ in that the suprascapula is only obsoletely serrate and the ventral apparently uniform dark brownish.

Scolopsis monogramma (Cuvier). *Fig. 170.*

Head $3 \frac{1}{5}$ to $3 \frac{1}{4}$; depth 3 to $3 \frac{2}{5}$; D. X, 9, 1; A. III, 7, 1; scales 44 to 48 in lateral line to caudal base, and 1 to 3 more on latter (10 to 12 non-tabular scales on caudal base); 6 scales above lateral line to spinous dorsal origin; 4 to soft dorsal origin, 11 below to spinous anal origin;

34 to 36 predorsal scales; snout $2 \frac{2}{3}$ to $2 \frac{4}{5}$, in head; eye $3 \frac{1}{5}$ to $3 \frac{2}{3}$; maxillary $2 \frac{3}{4}$ to 3; interorbital 3 to $3 \frac{1}{8}$.

Body elongately fusiform, compressed; least depth of caudal peduncle $1 \frac{2}{5}$ its length or $2 \frac{3}{5}$ to 3 in head. Head width $1 \frac{3}{4}$ to $1 \frac{7}{8}$ its length. Snout conic, long as wide. Eye rather ellipsoid, elevated, nearly midway in head length. Mouth oblique, moderate, jaws about even. Maxillary to hind nostril or eye; expansion $2 \frac{3}{4}$ to $3 \frac{1}{2}$ in eye. Bands of villiform teeth in jaws, with outer lower row of enlarged even conic ones; no others. Nostrils alike, small, together; hind one about last fifth in snout; Interorbital broadly convex. Hind preorbital edge denticulate, with uppermost denticle enlarged or 3 to $3 \frac{1}{3}$ in eye; hind preopercle edge denticulate, lower edge entire; opercle with small spine.

Rakers iv or v + 5 low or short flaps, much less than filaments; latter $2 \frac{2}{3}$ to 3 in eye. Scales ctenoid; basal striae 7 to 9; apical denticles 92 to 98; circuli very fine; 5 to 7 rows of scales on cheek to preopercle ridge; lateral line concurrent with dorsal profile, drops little above middle in least depth of caudal peduncle and tubes simple. Suprascapula and cluster of scales directly below, all with hind edges denticulate. Fourth dorsal spine $2 \frac{1}{8}$ to $2 \frac{3}{5}$ in head; first dorsal ray 2 to $2 \frac{1}{5}$; second anal spine $3 \frac{1}{3}$; second anal ray

2 $\frac{4}{5}$ to 3 $\frac{1}{6}$ upper caudal lobe $1\frac{1}{6}$; pectoral 1 $\frac{2}{5}$; ventral $1\frac{1}{4}$ to 1 $\frac{2}{5}$.

Color in alcohol dull uniform brownish generally, paler below and back with slight olive tint. Pale or gray-white line from snout tip to lower front of eye edge. Fins pale brown. Iris dull straw-color. Length 190 to 260 mm. One from Fiji and another without locality, likely from the Philippines?

The figure by Valenciennes¹²⁹ shows a yellow interorbital band, with a narrow pale blue adjoining one above. This is also indicated by Bleeker¹³⁰. Both these authors, however, do not show the pale preorbital line, though Cuvier¹³¹ mentions it in his description. Gunther simply gives the color as uniform.¹³²

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Regne Animal, Ed. Ill., Poiss., 1839, Pl. 31, fig. 3.

130

Atlas Ich., vol. 8, 1876-7, p. 11, Pl. 369(57) fig. 3.

131

Hist. Nat. Poiss., vol. 5, 1830, p. 254.

132

Cat. F. Brit. Mus., vol. I, 1859, p. 358.

Heterognathodon caninus (Cuvier)

Head $3\frac{1}{4}$; depth $3\frac{1}{4}$; D. X, 9; A. III, 7; scales 45 in lateral line to caudal base and 5? more (pockets) on latter;

3 scales above lateral line to spinous dorsal origin, same to soft dorsal origin, 10 below to spinous anal origin; about 30 predorsal scales; snout $3\frac{1}{4}$ in head; eye $3\frac{1}{4}$; maxillary $2\frac{3}{4}$; interorbital 3.

Body elongately fusiform; least depth of caudal peduncle $1\frac{1}{2}$ its length or $2\frac{2}{5}$ in head. Head width half its length. Snout conic, length $\frac{7}{8}$ its width. Eye elevated, hind pupil edge midway in head length. Mouth slightly inclined, jaws equal. Maxillary to eye, largely concealed by preorbital; expansion $3\frac{1}{2}$ in eye. Bands of small simple conic teeth in upper jaw and front of lower, and form single row of simple larger conic ones behind in latter; pair of close-set canines in front above and pair of wide-set divergent canines below anteriorly; no other teeth. Tongue small, free, far back. Front nostril about last third in snout, hind one larger and close behind. Interorbital broadly convex. Hind preopercle edge with obsolete minute serrae, lower edge entire. Opercle with rather short broad spine.

Rakers iv+vii low tubercles; filaments 3 in eye. Scales finely ctenoid; basal striae 9; apical denticles 95 to 100; circuli very fine; 5 rows of scales on cheek to preopercle ridge; large suprascapula scale, edge entirely finely pectinate. $\frac{7}{8}$ of eye; muzzle largely naked, with many pores in preorbital and sides of mandible; lateral line concurrent with dorsal profile,

drops about upper $2/5$ in least depth of caudal peduncle, large simple tubes short. Fourth dorsal spine 2 in head; third anal spine $2\frac{3}{4}$; first anal ray $2\frac{1}{10}$; upper caudal lobe $1\frac{1}{10}$; pectoral $1\frac{1}{3}$, ventral $1\frac{1}{3}$.

Color in alcohol dull brown, paler below. Pale band from upper hind eye edge up along lateral line, then straight to upper caudal peduncle edge. Another white band begins above maxillary or along lower edge of preorbital and eye, and then horizontally above pectoral origin to caudal base medially, expanding over middle of side until wide as pupil. Iris and fins brown. Length 130 mm. One without locality, probably from the Philippines?

Bleeker's figure¹³³ of Pentapus bifasciatus does not show the lower white band beginning above the premaxillary as in our example. He indicates a third longitudinal pale streak from the upper eye edge to soft dorsal origin, not present in our specimen.

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Atlas Ich., vol. 7, 1873-6, Pl. 294 (16) fig. 5.

Lethrinidae.Lethrinus ramak (Forskål). Fig. 171.

Head about 3 $\frac{1}{2}$; depth 2 $\frac{1}{2}$?; D. XI, 9; A. III, 8; tubes in lateral line 47 to caudal base and 2 more on latter; 7 scales above lateral line to spinous dorsal origin, same to soft dorsal origin, 16 below to spinous anal origin; predorsal scales 13; snout 1 $\frac{7}{8}$ in head from upper jaw tip; eye 5; maxillary 2 $\frac{4}{5}$; interorbital 3 $\frac{1}{2}$.

Body slongate, back elevated in front, body apparently well compressed; least depth of caudal peduncle $1\frac{1}{4}$ its length or $2\frac{1}{4}$ in total head length. Snout compressed, width 1 $\frac{4}{5}$ its length. Eye elevated, front edge midway in head length; 2 $\frac{3}{5}$ in snout. Mouth low, little inclined from horizontal; lower jaw protruded. Lips tough, fleshy, mostly papillose. Maxillary to front nostril. Teeth short; 4 strong canines in front of each jaw, followed by row of molars each side, of which median lower and last upper longest; no other teeth. Front nostril about last fourth in snout; hind nostril oblique, slit twice as large, midway between front one and eye. Interorbital convex, with median occipital keel rising up behind. Preopercle entire (Rakers extracted.) Scales in longitudinal rows; basal radiating striae 20 and usually about 5 to 7 accessory or incomplete submarginals; apical denticles minute, obtuse, 155 to 200; circuli very fine; smaller scales on breast, opercles and caudal base; lateral line concurrent with dorsal profile, extends little above middle along caudal peduncle sides and

tubes simple. Fifth dorsal spine $2 \frac{7}{8}$ in head; first branched dorsal ray $2 \frac{1}{2}$; third anal spine $3 \frac{1}{4}$; pectoral $1 \frac{1}{3}$; ventral $1 \frac{3}{5}$; caudal deeply forked, pointed lobes (tips damaged) with upper at least slightly longer than head.

Color in alcohol dull brown, scale edges darker. Traces of narrow yellowish lines, one along each row of scales, on abdomen and lower sides. Iris yellowish-brown. Teeth white.

Length 410 mm. Large skinned fish, without data, likely from

Fiji? *Drawing by Richard labeled Fiji.*

Agrees largely with Günther's figure,¹³⁴ which lacks scaly postocular area of our example, in which these in 2 rows opposite and for a vertical extent equal to vertical pupil diameter.

¹³⁴

Journ. Mus. Godeffroy, vol. I, 1873-5, p. 64, Pl. 46, p. 3.

Lethrinus mahsenoides Valenciennes. *Fig. 172.*

Head $2 \frac{5}{6}$ to 3; depth $2 \frac{2}{4}$ to 3; D. X or XI, 8, 1 or 9, 1; A. III, 8, 1; scales 45 to 47 in lateral line to caudal base and 2 more on latter; 6 or 7 scales above lateral line to spinous dorsal origin, 5 to 7 soft dorsal origin, 15 to 16 to spinous anal origin; 9 or 10 predorsal scales; snout 2 to $2 \frac{1}{3}$ in head from upper jaw tip; eye $3 \frac{1}{4}$ to $3 \frac{5}{6}$; maxillary $2 \frac{1}{2}$ to $2 \frac{3}{5}$; interorbital $3 \frac{2}{3}$ to 4.

Body well compressed, elongate, back scarcely elevated; least depth of caudal peduncle $1 \frac{1}{8}$ to $1 \frac{2}{5}$ its length or 3 in total head length. Snout, conic, compressed, width $1 \frac{1}{3}$ to $1 \frac{1}{2}$ its length. Eye rather ellipsoid, front pupil edge about midway in head length, little posterior in larger example. Mouth moderate, lower jaw slightly protrudes or jaws nearly even in young. Lips thick, tough, fleshy, Maxillary to hind nostril. Four short conic canines in front of each jaw, followed by row of moderate molars along each jaw edge; no other teeth. Front nostril about last fourth in snout, hind one well separated behind and closer to eye above. Interorbital convex. Preopercle entire.

Rakers $v+v$, short tubercles, much less than filaments, which about $3 \frac{1}{6}$ in eye. Scales in longitudinal rows; basal radiating striae 12 to 15, with 3 to 5 accessory or incomplete submarginals; apical denticles 82 to 106; circuli very fine; smaller scales on breast, opercle and caudal base; opercle with 6 rows of scales; lateral line concurrent with dorsal profile, extends little above middle along caudal peduncle side, and tubes simple. Fifth dorsal spine $2 \frac{1}{2}$ to 3 in head; fourth dorsal ray $2 \frac{1}{4}$ to $2 \frac{3}{5}$; third anal spine 3 to $3 \frac{2}{5}$; first branched anal ray $2 \frac{2}{3}$ to 3; upper caudal lobe $1 \frac{1}{3}$ to $1 \frac{2}{5}$; pectoral $1 \frac{1}{4}$ to $1 \frac{1}{3}$; ventral $1 \frac{1}{2}$ to $1 \frac{2}{3}$.

Color in alcohol dull brownish generally, paler to whitish below. Sides with dull silvery reflections. Hind edge on membrane of gill-opening dusky-brown, same shade marginally within gill-cover. Fins pale brown. Caudal with 5 indistinct narrow transverse brownish bands. Iris dull brown. Length 115 to 322 mm. Three from Fiji.

Largely agrees with Klunzinger's account¹³⁵, except the dorsal and soft anal spots not evident and patch of postocular scales not shown. These biserial in our examples.

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Fische Roth. Meeres, vol. I, 1884, p. 39, Pl. 6, fig. 2.

Lethrinus mahseena (Forsk.) fig. 173.
Drawing by Richard of example from Fiji.

Dentex dentex (Linnaeus). Fig. 174.

Drawing of young example from
Cape Verde Islands by J. H. Richard.

Sparidae.

Dentex japonicus (Bloch). Fig. 175.

Head $2 \frac{2}{3}$ to 3; depth $2 \frac{3}{5}$ to $2 \frac{4}{5}$; D. X, 9, 1; A. III, 7, 1; scales 45 to 48 in lateral line to caudal base, and 6 to 10 non-tubular on latter; 4 scales above lateral line to spinous dorsal origin; 13 or 14 predorsal scales; snout $3 \frac{1}{6}$ to $4 \frac{1}{8}$ in head from upper jaw tip; eye $2 \frac{3}{5}$ to $3 \frac{2}{4}$; maxillary $2 \frac{1}{5}$ to $2 \frac{2}{3}$; interorbital $4 \frac{2}{4}$ to $5 \frac{3}{5}$.

Body elongately ovoid, well compressed; least depth of caudal peduncle 1 to $1 \frac{3}{5}$ its length or $2 \frac{2}{3}$ to $3 \frac{1}{2}$ in total head length. Head width $2 \frac{1}{5}$ to $2 \frac{3}{4}$ its length. Snout compressed; least depth of caudal peduncle 1 to $1 \frac{3}{5}$ its length or $2 \frac{2}{3}$ to $3 \frac{1}{2}$ in total head length. Head width $2 \frac{1}{5}$ to $2 \frac{2}{4}$ its length. Snout compressed, convex, long as wide.

Eye elevated, hind edge about midway in head, little advanced in younger examples. Mouth moderately small, but slightly inclined; lower jaw protrudes a little. Maxillary to eye, reaches pupil or eye center in younger; expansion $2 \frac{1}{5}$ to $2 \frac{3}{4}$ in eye. Narrow band of fine conic uniform teeth in jaws; outer row of slightly enlarged well-spaced teeth; usually pair of wide-set upper canines forward, sometimes double; no other teeth. Nostrils together, alike; front one about last fourth in snout. Interorbital level to slightly concave. Preopercle edge with few minute serrae behind, lower edge entire; suprascapula entire.

Rakers $8+9$ or 10, lanceolate to rather robust, 2 to 3 in filaments, which $2 \frac{1}{5}$ to $2 \frac{1}{2}$ in eye. Scales finely ctenoid, in longitudinal rows parallel with lateral line above, horizontal rows below; scales but slightly smaller toward body edges; and small on caudal base; 3 rows of cheek scales; basal radiating striae 5 to 8; apical serrae 54 to 105; circuli extremely fine; lateral line concurrent with dorsal profile, oblique along caudal peduncle; side well above middle, to caudal base medially and small tubes simple. Fourth dorsal spine $2 \frac{1}{8}$ to $2 \frac{3}{4}$ in head; seventh dorsal ray about $1 \frac{7}{8}$; third anal spine $2 \frac{1}{3}$ to 3; third anal ray $1 \frac{5}{6}$ to 2; upper caudal lobe $1 \frac{1}{5}$ to $1 \frac{2}{5}$; pectoral $1 \frac{1}{6}$ to $1 \frac{1}{5}$; ventral $1 \frac{1}{5}$ to $1 \frac{1}{2}$.

Color in alcohol dull brown, paler below, with faint traces of lemon-yellow inside gill-opening. Broad band of lemon-yellow entire length of both dorsal bases. Lower part of body paler than back, with faint silvery tints. Length 45 to 158 mm. Two from Manila and 3 from "Sydney", the latter locality likely questionable.

Dentetx ^hmacrophthalmus (Bloch).

Head $2\frac{3}{4}$ to $2\frac{4}{5}$; depth $2\frac{1}{3}$ to $2\frac{2}{5}$; D. XII, 10, 1; A. III, 8, 1; scales 50 to 55 in lateral line to caudal base and 5 to 8 more on latter; 9 or 10 scales above lateral line to spinous dorsal origin, 7 to soft dorsal origin; 14 to 16 below to spinous anal origin; 40 predorsal scales; snout 3 to $3\frac{1}{8}$ in head; eye $2\frac{1}{2}$ to $2\frac{3}{4}$; maxillary $2\frac{1}{2}$ to $2\frac{2}{3}$; inter-orbital $3\frac{2}{5}$ to $3\frac{1}{2}$.

Body ellipsoid; compressed; least depth of caudal peduncle $1\frac{1}{4}$ to $1\frac{1}{3}$ in its length or $2\frac{2}{3}$ to $2\frac{3}{4}$ in head. Head width about half its length. Snout slightly compressed, long as broad. Eye elevated, hind pupil edge about midway in head.. Mouth small, jaws about even. Maxillary about to pupil; expansion 3 in eye. Front of jaws with close-set pair of canines in front and 4 below; irregular, double row of small simple conic teeth above, becoming single behind; single row of similar uniform lower teeth, though little larger than upper and 1 or 2 of laterals slightly enlarged

or canine-like. Front nostril about last third in snout and hind one midway between it and eye. Interorbital level. Preopercle and suprascapula entire.

Rakers 8+9, lanceolate, about $2/3$ of filaments and latter 2 in eye. Scales ctenoid, in longitudinal rows parallel with lateral line; basal radiating striae 7 to 10; apical serrae 23 to 27; circuli moderate; 7 or 8 rows of scales on cheek; small scales on soft dorsal and anal, and caudal basally; lateral line concurrent with dorsal profile, tubes simple. Fourth dorsal spine 2 in head; second anal spine $2 \frac{2}{5}$ to $2 \frac{4}{5}$; pectoral $1 \frac{2}{5}$? to $1 \frac{1}{4}$; ventral $1 \frac{3}{5}$ to $1 \frac{2}{3}$. In alcohol faded dull-olive-brown on back, sides and below. Fins paler, or more brownish. Length 48 to 53 mm. (caudal tips damaged). Two from "Hawaii?", doubtless from Cape Verde Islands?

We have a single Italian example in the Academy, for comparison. It shows: Head $2 \frac{3}{4}$; depth $2 \frac{1}{5}$; D. XII, 9, 1; A. III, 8, 1; scales 49 in lateral line to caudal base and 1 more on latter; 7 scales above lateral line and spinous dorsal origin; 14 below to spinous anal origin; 38 predorsal scales; snout $3 \frac{1}{2}$ in head; eye 3; maxillary $2 \frac{1}{3}$; interorbital $3 \frac{1}{3}$. Canines asymmetrical in front of jaws, 3 above and 11 below; upper teeth in very narrow band with outer row enlarged; lower teeth as single row of uniform even larger teeth. Rakers 9 15, 11, equal filaments, which $2/3$ in eye.

Scales with 6 or 7 basal radiating striae; apical serrae about 80; circuli very fine; 7 rows of scales on cheek 1 soft dorsal, anal and caudal with small scales. Second and third anal spines subequal, 3 in head; pectoral $1 \frac{1}{6}$. Uniform brown in alcohol. Length 195 mm. (caudal damaged).

Dentex gobioides Valenciennes¹³⁶ is very imperfectly described, with: D. XII; A. III, 9; body blue; opercles yellow; dorsal black, bordered red, pectorals red.

D. varigiensis Quoy and Gaimard¹³⁷ is also described with the same fin formula; snout long; pointed; 4 upper canines; silvery-white, spotted brown, more color on snout and along fins of back; length 114 mm.

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Hist. Nat. Poiss; vol. 6, 1830, 173. Tahiti.

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Ann. S. Af. Mus., vol. 6(2), 1908, p. 155. Natal.

Dentex miles Gilchrist and Thompson.

Head $3 \frac{1}{10}$ to $3 \frac{2}{5}$; depth $2 \frac{2}{5}$ to $2 \frac{3}{5}$; D. XII, 10, 1; A. III, 8, 1; scales 58 in lateral line to caudal base and 8 to 10 more (non-tubular) on latter; 8 scales above dorsal lateral line to spinous origin, 5 or 6 to first dorsal ray base, 15 or 16 below to anal origin; 50 to 52 predorsal scales; snout $2 \frac{2}{5}$ to $2 \frac{3}{5}$ in head; eye $3 \frac{2}{4}$ to 4; maxillary $2 \frac{7}{8}$ to 3; interorbital $3 \frac{1}{2}$ to $3 \frac{3}{5}$.

Body rather ellipsoid, back scarcely elevated, compressed; least depth of caudal peduncle $1\frac{1}{2}$ to $1\frac{2}{3}$ its length, or $2\frac{4}{5}$ in head. Head width $1\frac{7}{8}$ to 2 in its length. Snout little compressed, width 1 to $1\frac{1}{6}$ its length. Eye with hind pupil edge about midway in head. Mouth moderate, jaws equal. Maxillary to hind nostril; expansion 2 in eye. Upper canines 4, anterior; lower canines 6, outermost flaring out little each side; teeth otherwise largely conic, rather irregularly biserial and slightly molar behind; none on mouth roof or tongue. Lips thick, papillose. Front nostril slightly before last fourth in snout, hind one oblique slit more than twice as large, midway between front one and eye. Interorbital convex. Small opercular spine hooked downwards. Preopercle and suprascapular edges entire. Slight tooth-like point at front of preorbital.

Rakers 7 or 8 11 to 13, lanceolate, $1\frac{1}{2}$ to $1\frac{4}{5}$ in filaments, latter half of eye. Scales ctenoid, in longitudinal rows parallel with lateral line; radiating basal striae 6 to 16; apical serrae 76 to 96; circuli very fine; 9 rows of scales on cheek to preopercle ridge; small scales crowded on top of head, breast and bases of soft dorsal and anal, and over most of caudal; scales on head forward until opposite hind nostril; lateral line concurrent with dorsal profile, little high along caudal peduncle side and tubes bifurcate. Fourth dorsal spine $2\frac{1}{8}$ to $2\frac{1}{5}$ in head; second dorsal ray $2\frac{7}{8}$ to 3; second anal spine $2\frac{1}{2}$ to $2\frac{3}{5}$; pectoral $1\frac{1}{8}$; ventral $1\frac{2}{5}$ to $1\frac{1}{2}$.

Color in alcohol dull uniform brownish, with traces of silvery reflectionss. Length 210? mm. Cape of Good Hope. Another 215 mm. from "New Zealand" also included, which may really have been secured in South Africa.

Our examples differ from the account of D. miles¹³⁷ in eye $1\frac{1}{2}$ in snout, which equals interorbital width; maxillary to eye; 7 series of scales between preorbital and margin of preopercle; third dorsal spine longest or $\frac{2}{3}$ of head. Neither of our examples show any trace of the third dorsal spine elongated, and as it is chiefly in this last feature that they differ, we have placed them provisionally with the present species.

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Ann.S.Af.Mus., vol.6(2), 1908, p.155. Natal.

Labrus macrocephalus Lacépède¹³⁸, afterwards placed in the present genus and figured by Valenciennes¹³⁹, was thought possibly a species of Pagrus by Günther. The figure by Valenciennes shows: Head about 3; depth $2\frac{2}{5}$; D. spines X; second and third anal spines equal; pectoral about long as head; eye slightly less than preorbital width; lower preopercle limb scaleless though text says 4 large canines in front of mouth the figure (apparently inaccurate in this respect) shows 2 above and 3 below.

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Hist.Nat.Poiss., vol.3, 1802, pp.432, 480, Pl.26, fig.1. Le grande golfe de l'Inde.

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Règne An. Cuvier, Ed. Ill., Poiss., 1839, Pl.35, fig.2.

Dentex macrodens Castelnau¹⁴⁰ is a very imperfectly described species. Its author says it is very close to D. argyrozona, but its body large (possibly deeper?); the 3 anal spines short and equal; canines enormous; strong spring scales at ventral base like in the Pentapoes; D. XII, 9; length 39 mm. These details would suggest it as closer to L. macrocephalus than to the species with which he compares it.

D. brevis Kner¹⁴¹ is described with D.XI, 10 or 11; 9 scales above lateral line and 16 or 17 below; eye 1 2.3 in snout or equals preorbital depth and 1; in interorbital; large black blotch in and above pectoral axil.

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Poiss. Afr. Austr., 1861, p. 30.

141 Reise Novara, Fisch., 1867, p. 61. Cape of Good Hope.

Symphorus forsteri (Schneider) ³⁸⁴
Fig. 175.

~~Symphorus forsteri~~

Head 3; depth $2\frac{2}{5}$; D. X, 16; A. III, 9;
scales about $4\frac{1}{2}$ in lateral line to
caudal base and 2 or 3 more on latter;
6 scales above lateral line to soft
dorsal origin, 15 below; snout $2\frac{1}{4}$
in head; eye $4\frac{1}{6}$; maxillary $2\frac{1}{3}$.

Body elongately ovate, deepest
at soft dorsal origin. Caudal
peduncle shorter than deep, least depth
 $2\frac{1}{6}$ in head.

Symphorus Günther.

Levonbea new subgenus.

Type. — Sparus forsteri Schneider.

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Eye rather large, $1\frac{4}{5}$ in snout. Jaws even. The maxillary reaches opposite eye center, expansion $1\frac{3}{5}$ in eye. Several canines in front of each jaw. Interorbital little elevated. Scales uniform, equally large on cheeks and opercle; about 10 rows below eye across cheeks and lowest on preopercle flange. Fins naked, except few scales on caudal base. Lateral line nearly concurrent with dorsal profile, extends along side of caudal peduncle little above middle. Dorsal spines slender, all shorter than eye except last, edge of fin with notch behind end of each spine. Soft dorsal begins well before spinous anal and rays graduated down behind from second ray, which little shorter than head. Anal spines slender, graduated to third, which greatly longer than second; fourth ray longest, with other rays graduated down. Caudal little greater than head, pointed above and below. Pectoral pointed, not quite reaching anal. Ventral $\frac{2}{3}$ length of pectoral.

Largely bright red with yellowish tinge above maxillary, on postocular, opercle, before pectoral base, lower side of abdomen and caudal peduncle. Back and outer portions of vertical fins with light rosy tinge. Six obscure

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deeper red transverse bands on body. Behind gills opening and pectoral base maroon tinge. Body also with 7 purple-gray longitudinal bands. Iris vermilion and white. Spinous dorsal pale heliotrope purple. Soft dorsal with vermilion basally. Anal maroon along lower front portion, basally whitish. Caudal mottled pale red and yellow, margin dusky. Pectoral yellowish. Ventral whitish, with maroon tinge on front portion.

Length 66.2 mm.

Described from a painting made at Lebuhea, Fiji, by J. Grayson, June 1840. This is of great interest as we believe it to be the long lost Sparus forster Schneider. In the same

Syst. Ichth. Bloch, 1801, p. 282, Tongatabu.

work Schneider quotes Forster's M.S. name as Sparus striatus, and the description is amplified by Lichtenstein in 1844. The description of Symphorus taeniolatus Günther is so very suggestive of the

² Günth. Mag. Nat. Hist. London, (4) 9, 1872, p. 438. Celebes.

Sparus forsteri that we think it syn-
onymous. Günther's description, however,
states that the third to sixth dorsal
rays are produced in long filaments,
likewise the anal rays. An example
was 305 mm. long, quite likely the ap-
parent discrepancies are due to age.

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Pagellus mormyrus (Linnaeus). *Fig. 176.*

Head 3; depth 3; D. XII, II; A. III, 10; scales 59 in lateral line to caudal base and 8 more on latter; 5 scales above lateral line to soft dorsal origin; 15 predorsal scales; snout $2\frac{1}{4}$ in head; eye $4\frac{1}{2}$; maxillary $2\frac{7}{8}$; interorbital $4\frac{1}{8}$. Rakers 12 19. Scales with 8 to 10 basal striae; apical denticles 27 to 45, obtuse. Dark vertical streaks all faded very pale in alcohol. Length 155 mm. Cape Verde Islands.

Pagrus pagrus (Linnaeus).

Fig. 177.

Head 3; depth $2 \frac{2}{5}$; D. XII, 10, 1; A. III, 8, 1; scales 58 in lateral line to caudal base and about 10 more on latter; 8 scales above lateral line to spinous dorsal origin, 6 to soft dorsal origin and 14 below to spinous anal origin; 35 predorsal scales (to nearly opposite front eye edge); then $2 \frac{3}{5}$ in head; eye $3 \frac{1}{8}$; maxillary $2 \frac{3}{4}$; interorbital $3 \frac{1}{5}$.

Body ovoid, well compressed; least depth of caudal peduncle $1 \frac{2}{4}$ its length or $3 \frac{3}{5}$ in head. Head width half its length. Snout compressed, pointed, width $1 \frac{1}{6}$ its length. Eye large, elevated, $1 \frac{1}{6}$ in snout. Mouth little inclined from horizontal, jaws even. Maxillary slightly beyond front eye edge; expansion $2 \frac{3}{4}$ in eye. Front of jaws with outer series of broad short conic teeth, those directly in front smaller and more slender; upper hind teeth molar, 5 in outer row and inner row of 3, latter more forward; lower teeth like upper, only fewer conic ones forward; no others. Front nostril at last fourth in snout, porous; hind one oblique slit about twice as long, close above. Interorbital convex. Preopercle, preorbital and suprascapular edges entire.

Rakers 7?+8, 11, lanceolate, $1 \frac{3}{4}$ in filaments, which equal half of eye. Pseudobranchiae long as gill-filaments. Scales in rows parallel above lateral line, in horizontal rows below; scales crowded about body edges, on head above and along bases of rayed dorsal and anal and out over caudal base; 9 or

10 basal radiating striae; short apical denticles 55 to 65; circuli basal, fine; 7 rows of cheek scales; lateral line arch little high at first, then obliquely down and little elevated along caudal peduncle side to caudal base; tubes simple, short, usually small pore above and another below on each scale in lateral line. Third dorsal spine $2 \frac{2}{5}$ in head; second anal spine $3 \frac{1}{2}$; ventral spine $2 \frac{2}{3}$. Color in alcohol dull brown, uniform. Length 125 mm. (caudal damaged). Rio Janeiro.

Pagrosomus auratus (Schneider). *Fig. 178 to 180*.

Head $2 \frac{1}{4}$ to $3 \frac{1}{10}$; depth $2 \frac{1}{6}$ to $2 \frac{3}{5}$; D. XII, 9, 1 to 11, 1; A. III, 8, 1; scales 50 to 57 in lateral line to caudal base and 5 to 7 more on latter; 8 or 9 scales above lateral line to spinous dorsal origin; 5 to 7 to soft dorsal origin, 15 or 16 below to spinous anal origin; 42 to 47 predorsal scales; snout $2 \frac{1}{3}$ to $2 \frac{7}{8}$ in head; eye $2 \frac{7}{8}$ to 4; maxillary $2 \frac{2}{5}$ to 3; interorbital $3 \frac{1}{8}$ to $3 \frac{2}{3}$; preorbital width, below eye to maxillary end, $3 \frac{7}{8}$ to $4 \frac{1}{8}$, or 5 in young.

Body oblong, well compressed, back elevated, and much shorter in young;; least depth of caudal peduncle $1 \frac{1}{5}$ to $1 \frac{3}{5}$ its length or 3 to $3 \frac{1}{4}$ in head. Head width 2 to $2 \frac{7}{8}$ its length. Snout compressed, width 1 to $1 \frac{1}{2}$ its length. Eye about midway in head length in young, hind pupil edge about midway in large example; elevated, $1 \frac{2}{3}$ to $1 \frac{3}{4}$ in snout, or equally long in young. Mouth moderate, jaws about even.

Maxillary to eye in young, to first third in eye in larger examples; expansion $1 \frac{7}{8}$ in eye in adult, 3 in young. Teeth as 4 conic canines in front of each jaw, sometimes 5 below; upper teeth slightly longer and little closer set; other teeth granular in front of each jaw, soon give place to double row of molars comprising 3 to 7 in upper row and 5 to 8 in lower inner row each side; in young inner row much less developed or only 2 or 3 slightly enlarged above or none below. Lips moderate, finely papillose inside. Front nostril at last fourth in snout; hind one midway between frontone and eye, oblique slit 3 times front. Interorbital convex, flattened in young. Preopercle edge entire, also suprascapula.

Rakers 7 or 8 + 11, in young 2 + 10; short points, about half of filaments, which $1 \frac{1}{4}$ in eye, or 3 in young. Scales finely ctenoid basal radiating striae 11 to 14, or 8 to 10 in young; apical denticles 47 to 98, about 31 to 48 in young; circuli fine 8 rows of scales on cheek; 8 or 9 rows in young; scales smaller along body edges and on caudal base; lateral line concurrent with dorsal profile, tubes simple. Fourth dorsal spine 2 to $2 \frac{1}{2}$ in head; fourth dorsal ray 3; second anal spine $2 \frac{4}{5}$ to $3 \frac{4}{5}$; third anal ray 3 to $3 \frac{1}{3}$; upper caudal lobe 1 to $1 \frac{1}{5}$; pectoral $1 \frac{2}{5}$ to $1 \frac{1}{8}$; ventral $1 \frac{1}{2}$ to $1 \frac{7}{8}$? In alcohol uniform dull brown generally, paler below with silvery-white sheen. Iris dull and straw-brown

Fins uniform pale brown. Length 103 to 390 mm. Sydney, Australia and Cape of Good Hope; 4 examples. We also include 3 from Melbourne, Australia, and one from the Hawaiian Islands, in the Academy.

The Melbourne examples are brown generally in alcohol, with pale lavender tints, especially on head and about pre-orbital. Lower surfaces pale to white, with creamy tinge on head below. Fins brownish, with dull lavender shades on membranes, broadly submarginal on anal and ventral membranes. Pectoral axil with rather broad neutral tint; also dusky lavender above eye along its edge. Iris whitish, apparently silvered when fresh. Other examples dull brownish generally, paler below, with silvery-white sheen. Fins uniform dull brown. Iris dull straw-brown. All show axillary dark.

Fowler identified the Townsend example in the Academy from the Hawaiian Islands, which we include above, as Sparisomus unicolor¹⁴². The occurrence of S. unicolor in the Hawaiian Islands was discounted by Jordan and Evermann¹⁴³, for no obvious reason, apparently other than that they failed to obtain other material from the islands. They further confuse matters by placing the record with Monotaxis grandoculis (Forsk.), a very different fish. We therefore insist upon its original status, as its occurrence in Hawaii has never been demonstrated as either improbable or unlikely.

142 Proc. Acad. Nat. Sci. Phila., 1900, p. 502.

143 Bull. U.S. Fish Com., vol. 23, pt. 1, 1903(1905), p. 244.

Jordan and Thompson have retained Pagrosomus major (Schlegel)¹⁴⁴ as a distant species, setting forth the more narrow preorbital in the Japanese species. Though they had a much larger Australian example than any before us, the preorbital width is at least intermediate. As it is much narrower in young Australian material this character may not be worth much. The scales above the lateral line also vary likewise. These writers give the color as silvery, darker above and fins uniform. No mention of the dark axillary blotch is made, though under P. major they state from Kishinouye that the base of the pectoral is dark brown. The change with age, like the formation of the bony supraoccipital and flabby swollen snout, would barely appear to be specific characters. Chrysophrys major Schlegel therefore gives way to the older Labrus auratus Schneider, originally from New Zealand.

P. auratus has been doubtless recorded by Gunther from the Cape of Good Hope. Our example from there, however, agrees in every way with our other materials, and though faded, still shows traces of the dark pectoral axilla.

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Proc. U.S. Nat. Mus., vol. 41, 1912, p. 576.

Archosargus unimaculatus (Bloch). *Fay - 181.*

Head $3 \frac{1}{5}$ to $3 \frac{2}{5}$; depth $2 \frac{1}{10}$; D. XIII, 10 or 11, 1; A. III, 10, 1; scales 44 to 46 in lateral line to caudal base and 5 to 8 more on latter; 9 scales above soft lateral line to spinous dorsal origin; 7 or 8 to dorsal origin; 14 to 16 below to spinous anal origin; 30 to 38 predorsal scales; snout $2 \frac{2}{5}$ to $2 \frac{3}{5}$ in head; eye $3 \frac{1}{2}$ to $3 \frac{7}{8}$; maxillary 3 to $3 \frac{1}{2}$; interorbital 3 to $3 \frac{2}{5}$.

Body compressed, fusiform, with back evenly elevated; least depth of caudal peduncle long as deep, $2 \frac{1}{5}$ to $2 \frac{1}{2}$ in head. Head width $1 \frac{4}{5}$ to $1 \frac{7}{8}$ in its length. Snout compressed, width $1 \frac{1}{3}$ its length. Eye elevated, center about midway in head length, little backward in young example. Mouth low, small, lower jaw slightly included. Maxillary $\frac{3}{4}$ to eye, $\frac{4}{5}$ in smaller example; expansion $2 \frac{1}{2}$ to $2 \frac{3}{4}$ in eye. Teeth as 6 notched incisors in front of each jaw, followed by trifle row of molars above, with 3 of innermost each side little enlarged; lower incisors followed by double row of molars with side teeth 3 or 4 innermost enlarged, little; various other small or granular teeth scattered about; especially forward; Front nostril at last third in snout; hind one oblique slit 4 times as long and close before eye. Interorbital convex. Suprascapula entire.

Rakers 7+7 short points, about $1/3$ of filaments, which $1 \frac{4}{5}$ in eye. Scales finely ctenoid, in even longitudinal rows parallel with lateral line; basal radiating striae 12 to 20; weak apical serrae about 38; circuli very fine; 5 rows of scales on cheek; lateral line concurrent with dorsal profile, tubes with slight terminal fork. Fourth dorsal spine $1 \frac{7}{8}$ in head; second anal spine $1 \frac{4}{5}$ to 2; upper caudal lobe 1 to $1 \frac{1}{10}$, deeply emarginate; pectoral 1 $\frac{1}{4}$ to $1 \frac{1}{3}$; ventral $1 \frac{1}{4}$ to $1 \frac{1}{3}$. In alcohol uniform brownish, with silvery white reflections. Round obscure dusky blotch about size of eye just below lateral line opposite first dorsal spines. Length 137 to 160 mm. Rio Janeiro. Two examples. Also 2 in the Academy, with same data, included above.

A young example, 38 mm. long, from Rio Janeiro in the Wilkes collection. It shows: Head $2 \frac{3}{4}$; depth $2 \frac{3}{4}$; D. XIII, 11, 1; A. III, 10, 1; scales 45 in lateral line to caudal base; snout $3 \frac{1}{4}$ in head; eye 3; maxillary $3 \frac{1}{6}$; interorbital $4 \frac{1}{2}$; head width 3. Snout broad as long. Hind pupil edge midway in head length. Maxillary reaches eye; expansion 2 in eye.

Diplodus argentatus (Valenciennes). *Fig. 182.*

Head 3; depth $1 \frac{4}{5}$; D. XII, 14, 1; A. III, 13, 1; scales 64 in lateral line to caudal base and 2 more on latter; 9 scales above lateral line to spinous dorsal origin, 8 to soft

dorsal origin; 18 below to spinous anal origin; 28 predorsal scales; snout $2\frac{1}{2}$ in head; eye $3\frac{1}{6}$; maxillary 3; interorbital 3.

Body deeply ellipsoid, strongly compressed; caudal peduncle long as deep and least depth $2\frac{2}{3}$ in head. Head width half its length. Snout conic, about long as wide (without teeth). Eye round, hind pupil edge midway in head length. Maxillary to eye; expansion $2\frac{1}{2}$ in eye. Front of each jaw with 8 entire incisors; hind teeth as 2 rows of flat molars. Front nostril at last fourth in snout; hind one nearly 3 times as large, obliquely slit-like and midway between front one and eye. Interorbital convex. Preopercle entire; least width of preorbital half of eye. Suprascapula entire.

Rakers 8 11, lanceolate, $2\frac{1}{2}$ in filaments, latter 2 in eye. Scales in longitudinal rows parallel with lateral line, but slightly smaller towards body edges, small soft dorsal, anal and caudal bases; basal radiating striae 7; apical denticles 40 to 56; circuli very fine; 5 rows of scales on cheek; lateral line mostly concurrent with dorsal profile, slopes down little obliquely along caudal peduncle side above. Tubes simple. Fifth dorsal spine $1\frac{9}{10}$ in head; second anal spine 2. In alcohol dull brown, sides and below scarcely paler. Length 132 mm. Rio Janeiro.

Pachymetopon grande Günther. *Fig. 183* -

Head 3 to $3\frac{1}{4}$; depth $2\frac{1}{3}$ to $2\frac{2}{5}$; D. X, 12, 1; A. III, 10, 1; scales 64 to 66 in lateral line to caudal base; 10 or 11 scales above lateral line to spinous dorsal origin, 9 or 10 to first branched dorsal ray base, 20 or 30 below to spinous anal origin; 30 to 38 predorsal scales to naked occipital medially; snout $2\frac{1}{2}$ to $2\frac{3}{4}$ in head; eye 4; maxillary 3; interorbital $2\frac{1}{2}$.

Body strongly compressed, deeply ovoid; least depth of caudal peduncle 1 to 1.5 its length or $2\frac{1}{3}$ to $2\frac{1}{2}$ in head. Head width $1\frac{2}{3}$ to $1\frac{3}{4}$ in its length. Snout convex, length $\frac{7}{8}$ to 1 in its width. Eye rounded, hind pupil edge midway in head length. Mouth small, broad, gape short, jaws even. Maxillary nearly to hind nostril; expansion 2 in eye. Teeth cuneate or broadly angular, compressed, in wide bands in front of mouth; outer row enlarged, pointed, much more slender, gradually smaller backward, entire; no other teeth. Front nostril about last $\frac{2}{5}$ in snout; hind nostril large oblique slit about midway between front one and eye. Interorbital convex. Preopercle edge entire; least preorbital width $1\frac{2}{5}$ in eye; suprascapular edge entire; surface striate.

Rakers $8+13$, lanceolate, $1\frac{7}{8}$ in filaments, which $1\frac{1}{3}$ in eye. Scales finely ctenoid, in oblique rows above lateral line anteriorly, in horizontal rows below; very small and crowded

scales on chest, breast, pectoral, most of caudal, soft dorsal and anal on their basal halves, opercles and under surface; radiating basal striae 12 to 17; apical denticles 80 to 95; circuli very fine 8 or 9 scales on cheek, lateral line nearly parallel with dorsal profile, little high along upper side of caudal peduncle, and well exposed tubes simple. Fourth dorsal spine $2 \frac{2}{3}$ to $2 \frac{4}{5}$ in head; second dorsal ray $2 \frac{4}{5}$ to $3 \frac{1}{4}$; third anal spine $3 \frac{1}{8}$ to $3 \frac{1}{5}$; caudal moderately forked, upper lobe $1 \frac{1}{4}$ to $1 \frac{1}{3}$; pectoral 1; ventral $1 \frac{3}{4}$.

Color in alcohol rather dark brown, slightly paler on lower surface. Fins more or less dusky. Iris brassy-brown. Length 222 to 235 mm. Two from Cape of Good Hope.

Our example differs a little from the original account as Gunther gives D.XI,11 and lateral line 88^{145} , but in this he doubtless counted all intruding scales as well as those on the caudal base, besides his fish being over twice the size of ours. The rounded frontal protuberance in our examples only from a slightly convex profile. Gunther gives but 6 rows of cheek scales. He describes the scales as not ciliated though our examples show them finely ciliated.

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Cat. F.Brit.Mus., vol. I, 1859, p. 424.

KyphosidaeGirella tricuspidata (Quoy and Gaimard). *Fig. 184.*

Head $3 \frac{2}{3}$; depth $1 \frac{2}{5}$; D. XV, 12, 1; A. III, 12, 1; scales 48 in lateral line to caudal base and about 6 more larger non-tabular ones on latter; 13 scales above lateral line to spinous dorsal origin, 8 to soft dorsal origin, 16 below to soft anal origin; 27 predorsal scales; snout 3 in head; eye $4 \frac{2}{3}$; maxillary $3 \frac{2}{3}$; interorbital $2 \frac{4}{5}$.

Body elongately ellipsoid, strongly compressed; length of caudal peduncle about $\frac{5}{6}$ its least depth; which $1 \frac{7}{8}$ in head. Head width $1 \frac{7}{8}$ its length. Snout convex over surface, slightly depressed pedially, long as wide. Eye rounded, little elevated hind edge about midway in head length. Mouth broad, gape short, lower jaw slightly included. Maxillary concealed, to front nostril, 3 in eye. Teeth compressed, cuneate, in broad bands in jaws, each tooth tridentate. Front nostril about last third in snout; hind one slightly larger and little nearer front one than eye. Interorbital convex. Preopercle edge entire, with traces of very obsolete minute serrae along hind edge.

Rakers $15+21$, lanceolate, 2 in filaments, which $1 \frac{1}{6}$ in eye. Scales finely ctenoid; in longitudinal rows parallel with lateral line above and horizontal below; scales smaller all along body edges, especially on breast and belly; radiating basal striae 21 or 22; apical denticles 40 or 45; circuli moderately fine; 11 rows of scales across cheek; lateral line

concurrent with dorsal profile, slightly above middle along caudal peduncle side. Seventh dorsal spine $2 \frac{1}{3}$ in head; second dorsal ray $2 \frac{1}{5}$; second anal spine $1 \frac{7}{8}$; fourth dorsal ray $1 \frac{2}{3}$; upper caudal lobe $1 \frac{1}{8}$; pectoral $1 \frac{1}{4}$; ventral $1 \frac{1}{4}$. In alcohol umber-brown generally, slightly paler on under surface of head, head, chest and belly. Fins brownish, vertical and ventrals little darker than body. Iris pale brown. Length 238 mm. Sydney.

Kyphosus ~~elegans (Peters)~~ fuscus (Lacépède). Fig. 185.

Head $3 \frac{1}{3}$; depth 2; D.XI, 12, 1; A. III, 11, 1; scales 87 in lateral line to caudal base; tubes in lateral line 52 to caudal base and 7 more on latter; 11 scales above lateral line to spinous dorsal origin; 10 to soft dorsal origin, 16 below to spinous anal origin; about 76 predorsal scales; snout 3 in head; eye $3 \frac{1}{2}$; maxillary 3; interorbital $1 \frac{3}{4}$.

Body deeply ovate, strongly compressed; least depth of caudal peduncle $1 \frac{1}{4}$ in its length or $2 \frac{1}{6}$ in head. Head width $1 \frac{5}{6}$ its length. Snout convex, long as wide. Eye circular, hind pupil edge about midway in head. Mouth small, lower jaw slightly shorter. Maxillary slightly beyond eye front, not quite to pupil. Teeth compressed, end rounded, bent at right angles to radiating bases long as erect portions; patch of small flat low teeth across vomer. Nostrils close; front one at last fifth in snout; hind one little larger, inclined slit. Interorbital broadly convex. Preorbital and preopercle edges minutely and obsoletely spinescent; suprascapula membranous.

Rakers $8+14$; lanceolate; $3/4$ of filaments, latter $1\frac{1}{2}$ in eye. Scales ctenoid, in parallel longitudinal rows above lateral line; below in horizontal rows; scales smaller along body edges at vertical fin bases, and extend well out over soft fins to their edges; basal striae 4 or 5; apical denticles 46; 6 rows of scales on cheek to preopercle ridge; lateral line mostly concurrent with dorsal profile, midway along caudal peduncle side, tubes simple; Seventh dorsal spine $1\frac{5}{6}$ in head; second dorsal ray $1\frac{9}{10}$; third anal spine $3\frac{1}{5}$; second anal ray 2; upper caudal lobe 1; pectoral $1\frac{2}{5}$; ventral $1\frac{2}{5}$. In alcohol dull brownish, paler below. Fins dull brown; Iris pale brown. Length 177 mm.

Oahu.

As no characters worthy of specific distinction appear, Pimelepterus sandvicensis Sauvage¹⁴⁶ may be merged in the synonym of the present species.

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Bull. Soc. Philom; Paris, vol.3, 1880. Honolulu.

Doydixodon laevifrons (Tschudi). *Fig. 186 and 187.*

Head 3 to $3\frac{1}{3}$; depth $2\frac{2}{5}$ to 3; D. XII, I, 14, 1 to 16; A. III, 1, 11, 1 or 12; tubular scales 44 to 45 in lateral line to caudal base; 14 or 15 scales above lateral line to soft dorsal origin; 17 below to spinous anal origin; 33 predorsal scales; snout $3\frac{1}{6}$ to 4 in head; eye $2\frac{2}{5}$ to $3\frac{1}{8}$; maxillary $2\frac{3}{4}$ to 3; interorbital $3\frac{1}{4}$ to 4.

Body elongately and slightly ovoid, back scarcely elevated; Least depth of caudal peduncle about equals its length or $1 \frac{7}{8}$ to $2 \frac{1}{10}$ in head. Head width $1 \frac{2}{3}$ to 2 its length. Snout convex; length $\frac{4}{5}$ its width. Eye rounded, hind edge about midway in head length, or hind pupil edge midway in younger example. Mouth small, low, lower jaw shorter. Maxillary to pupil; expansion 2 to $2 \frac{3}{5}$ in eye. Teeth compressed, trifid or with brown median incisor like lobe and pointed denticle each side, in several rows of larger ones followed by band of minute ones; no others. Nostrils similar, separated, hind one nearer eye than front one which near last fourth in snout. Interorbital broadly convex. Preopercle edge rough, especially so just above angle in larger example.

Rakers lanceolate, ~~15~~ 15, about long as filaments or $1 \frac{3}{4}$ in eye. Scales finely ctenoid, in longitudinal rows slightly inclined forward, all smaller and more crowded on front portion of body, especially on predorsal, very fine on chest and breast; radiating basallstriae 11 to 15; apical denticles 30 to 45; circuli moderately fine; 11 rows of scales across cheek; lateral line mostly concurrent with dorsal profile, about midway along caudal peduncle side and tubes simple. Seventh dorsal spine $2 \frac{2}{3}$ to 3 in head; first branched dorsal ray $1 \frac{1}{3}$ to $1 \frac{2}{3}$; third anal spine $2 \frac{2}{5}$ to 3; first branched

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Mullidae.

Upenoides arge (Jordan and Evermann).

Head $3 \frac{2}{3}$ to $3 \frac{3}{4}$; depth 4 to $4 \frac{2}{5}$; D.VIII - I, 8, 1;
A. II, 6 1 or 7; scales about 36 in lateral line (damaged)
to caudal base and 4 more on latter; 3 scales above lateral
line to spinous dorsal origin, 4 to soft dorsal origin, 7
below to spinous anal origin; 15 or 16 predorsal scales;
snout $2 \frac{1}{4}$ to $2 \frac{1}{3}$ in head; eye $4 \frac{4}{5}$ to $5 \frac{2}{5}$; maxillary
 $2 \frac{1}{8}$ to $2 \frac{1}{3}$; interorbital $3 \frac{1}{10}$ to $3 \frac{1}{6}$.

Body elongate, fusiform, compressed; least depth of caudal peduncle about half its length or $2\frac{1}{2}$ to $2\frac{3}{5}$ in head. Head width $1\frac{5}{6}$ to 2 in its length. Snout conic, width $1\frac{1}{8}$ its length. Eye elevated, hind pupil edge about midway in head. Mouth rather large,, lower jaw slightly included. Maxillary to front pupil edge or eye center; expansion $1\frac{1}{6}$ to $1\frac{1}{4}$ in eye. Bands of small simple conic teeth in jaws; vomer and palatines each with patch of similar teeth, though palatine more obtuse; none on tongue. Barbels not extending beyond hind preopercle edge, flexible. Nostril small, midway in snout length. Interorbital slightly elevated convexly, or nearly level.

Rakers iv 2+10+vi or vii, lanceolate, $1\frac{1}{3}$ in filaments, which latter equal eye. Scales finely ctenoid; in rather even longitudinal rows; small scales over most first few soft dorsal and anal rays; caudal base scaled; 4 rows of cheek scales behind spinous dorsal tip and soft dorsal origin; basal radiating striae 4 to 8; edge scalloped; apical denticles 163 to 190; circuli very fine; lateral line concurrent with back to caudal base medially, little high along caudal peduncle side at first; tubes arborescent. First dorsal spine $1\frac{1}{4}$ to $1\frac{1}{3}$ in head; first dorsal ray 2; second anal spine $3\frac{1}{5}$ to $3\frac{1}{2}$; first anal ray $1\frac{5}{6}$ to $1\frac{9}{10}$; caudal deeply forked, lower lobe 1; pectoral $1\frac{2}{5}$; ventral $1\frac{3}{5}$. In alcohol largely faded, brownish generally. Trace of about 5 obscure dark horizontal bands on

spinous dorsal; upper caudal lobe with 5 dusky to blackish oblique bars, lower lobe with 4, and also 2 median narrow horizontal bars on fin. Length 275 to 303 mm. One from Hilo and the other without locality, though likely Hawaiian?

Compared with a recent example in the Academy, 263 mm. long from Honolulu, and agrees in most every detail.

Upeneoides tragula (Richardson).

Head $3\frac{1}{2}$; depth $4\frac{1}{4}$; D. VIII - I, 8, 1; A. II, 6, 1; scales (pockets) 28 in lateral line to caudal base and 3 more on latter; 2 scales above lateral line to spinous dorsal origin, 3 above to soft dorsal origin, 14 (pockets) scales on predorsal; snout $2\frac{1}{2}$ in head; eye $4\frac{1}{4}$; maxillary $2\frac{1}{5}$; interorbital $3\frac{1}{2}$.

Body slender, compressed, back not elevated; least depth of caudal peduncle half its length or $2\frac{1}{2}$ in head. Head width $2\frac{1}{8}$ in its length. Snout conic, tip rather blunt, width $1\frac{1}{2}$ its length. Eye elevated, close to upper profile, center about midway in head. Mouth moderate, lower jaw included. Maxillary slightly beyond front eye edge, though not quite to pupil; expansion $1\frac{3}{4}$ in eye. Teeth small, simple, conic, in bands in jaws, on vomer and palatines; no others. Barbels not quite to hind preopercle edge, $1\frac{2}{4}$ in head, flexible. Front nostril small simple pore, about midway in snout length; hind one short vertical slit close before front eye edge. Interorbital level. Opercular spine small, about level with lower pupil edge.

Rakers iii, 2+1, iii, lanceolate, nearly long as filaments or $1\frac{3}{4}$ in eye. Scales finely ctenoid, in even longitudinal rows mostly parallel with lateral line; caudal scaly (most scales now fallen); 3 rows of cheek scales; basal radiating striae 6, and 2 or 3 extend apically; apical denticles about 96; circuli very fine; lateral line mostly concurrent with dorsal profile, slopes little high along caudal peduncle side until median at caudal base; tubes with 1 to 3 branches above, fewer on last scales. Second dorsal spine $1\frac{1}{2}$ in head; first dorsal ray $1\frac{2}{4}$; second dorsal ray $2\frac{2}{3}$; second anal ray $1\frac{4}{5}$; caudal well forked, lower lobe equals head; pectoral $1\frac{2}{5}$; ventral $1\frac{1}{4}$.

In alcohol coloration largely faded dull brown, slightly mottled, paler below. Traces of dark longitudinal streaks along lateral line. Spinous dorsal whitish, with broad blackish band and median oblique pale dusky band. Soft dorsal pale brown with 2 horizontal deep brown bands, upper subapical and lower median. Caudal pale brown 3 broad dark transverse bands on each lobe. Ventral and anal pale, each with 3 dark cross-bars or as many rows of dark spots. Pectoral pale. Length 138 mm. Sydney.

Upeneoides sulphureus (Cuvier).

Head $3\frac{1}{8}$ to $3\frac{1}{3}$; depth $3\frac{1}{8}$ to 4; D. VIII - I, 8; A. II, 6; scales 34 or 35 in lateral line to caudal base and 3 or 4 more on latter; 2 scales above lateral line to spinous

dorsal origin; 3 above to soft dorsal origin, 6 below to spinous anal origin; snout $2 \frac{2}{5}$ to 3 in head; eye $3 \frac{1}{4}$ to 4; maxillary $2 \frac{1}{4}$ to $2 \frac{3}{4}$; interorbital $3 \frac{1}{6}$ to 4. Rakers 7 to 9+19 or 20. Scales with 4 or 5 radiating basal striae, edges scalloped; apical denticles 72 to 75; circuli very fine. One from "Singapore or Polynesia" 115 mm. We also include 5 examples in the Academy 57 to 130 mm. long, from Sumatra. Comparison with the types of U. belaque Fowler¹⁵⁸ shows the latter synonymous. At the time of its comparison with the the Sumatran material the author was unfortunately guided by such specimens as agreed somewhat with Day's figure. The Wilkes fish has very firm osseous barbels, straight, and only tips flexible, while in all the other material examined they are more flexible. Similar firm barbels were also noticed in Sumatran examples of U. moluccensis in the Academy.

¹⁵⁸

Proc. Acad. Nat. Sci. Phila., 1918, p. 40, fig. 16. Philippines.

When fresh in arrack the Sumatran examples were pale olive-brown above, white below, more or less tinted pale red and silvery. Opercle with indistinct purplish tinge. Golden stripe, about $\frac{2}{3}$ width of eye, along side of trunk to caudal base. Soft dorsal and caudal mostly grayish. Spinous dorsal with broad blackish blotch at tip and usually 2 broad dusky

olive transverse cross-bands, upper median and lower nearly basal. Intervals between dark cross-bands on spinous dorsal, whitish. Soft dorsal with about 3 ill-defined rows of dusky-brown spots, formed as cross-bands. Caudal edge gray-white. Pectoral and ventral mostly sulphury basally. Iris carmine.

Great discrepancies exist in the earlier accounts of this species, if the various references are correctly allocated besides considerable variation in structure. Under *Upeneus shlpheureus*, from Sunda Straits, Cuvier simply says¹⁵⁹ both dorsals and caudal are reddish, evidently from notes on fresh material. No mention is made of any markings on the dorsal fin.

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Hist. Nat. Poiss., vol. 3, 1829, p. 450.

Under *Upeneoides sulphureus* Sauvage¹⁶⁰ notes the typical material in the Paris Museum. His account is likely largely from the same material, though as other localities are given, this is not certain. He gives his examples as 265 mm., though his figure is only 165 mm. The latter shows the third dorsal spine much the longest or longer than fourth, which also longer than second; maxillary to front nostril; 3 rows of cheek scales; barbels nearly long as head; eye shown at least 1/3 of snout; dorsal fin of uniform color. In the description the spinous dorsal is said to have 3 or 4 yellowish bands and its end black, also upper caudal lobe black.

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Hist. Nat. Madagascar, Poiss., vol. 16, 1891, p. 217, Pl. 27, fig. 1.

Day figures a very different fish as U. sulphureus¹⁶¹ as it shows the maxillary nearly reaching eye center, and the eye almost long as snout. Its barbels reach only far back as hind preopercle edge and cheek scales in only 2 rows. Coloration greatly different, in that spinous dorsal with black end and otherwise pale with wide darker transverse band. Opercle dark above and both soft dorsal and anal with median longitudinal dark band, oblique and not horizontal. Day says barbels reach hind orbital edge in the young and nearly to preopercle angle in adult. They are figured as curved and as no mention is otherwise made it may be inferred that they were rather flexible. On the contrary Sauvage shows them very straight, suggesting they were firm or rigid. Day describes the first dorsal as milk-white edged with black, having 2 horizontal yellow lines finely dotted with black. The second dorsal is also noted with only one band. Further he notes some specimens with the caudal banded much as in U. vittatus but bands fewer and paler. It is evident, upon comparing his description of U. fasciolatus¹⁶² that he has figured the same. In this connection Bleeker places U. fasciatus with a query in his synonymy of Upeneus moluccensis¹⁶³

¹⁶¹ Fishes of India, part I, 1875, Pl. 30, fig.3.

¹⁶²

Proc. Zool. Soc. London, 1868, p. 151.

¹⁶³

Nat. Tijds. Ned. Ind., vol. 8, 1855, p. 409.

a very different fish, as Sumatran examples in the Academy show, this his action invalid.

Upeneus bivittatus Valenciennes¹⁶⁴ is included as a synonym by many writers. The original account says both dorsals white, varied, greenish, and first ends in dark spot; caudal clear gray; length 126 mm.

Bleeker finally figures a fish as Upeneus sulphureus which is still different in its color pattern. It has the short barbels of Day's figure, large maxillary, large eye, long second and third dorsal spines, but differs in 3 rows of cheek scales, spinous, dorsal tip pale, four bands on spinous dorsal with uppermost black, and soft dorsal tip black, fin with 2 pale longitudinal bands. Its barbels are shown waved, therefore evidently not pungent.

Upeneichthys vlamingii (Cuvier).

Head $2 \frac{7}{8}$ to 3; depth $2 \frac{7}{8}$ to $3 \frac{1}{6}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 26 or 27 in lateral line to caudal base and 4 more on latter; 2 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin, 6 below to spinous anal origin; 11 or 12 predorsal scales; snout $1 \frac{9}{10}$ to $2 \frac{1}{4}$ in head; eye 4 to $4 \frac{7}{8}$; maxillary $2 \frac{4}{5}$ to 3; interorbital $3 \frac{4}{5}$ to $4 \frac{3}{5}$.

Body moderately long, ovoid, back little elevated forward; least depth of caudal peduncle $1 \frac{1}{2}$ its length or $2 \frac{1}{2}$ to $2 \frac{4}{5}$ in

head. Head width 2 to $2\frac{1}{4}$ its length. Snout rather conic, compressed, width $1\frac{1}{6}$ to $1\frac{1}{2}$ its length. Eye elevated, nearly midway in head length. Mouth small, lower jaw included. Maxillary to front nostril, or little beyond in smaller examples, though not to eye; expansion 2 to $2\frac{1}{2}$ in eye. Teeth small, rather obtuse, biserial above; lower biserial forward but uniserial along jaw sides; small patch of low vomerine teeth; no others. Mental barbels not extending beyond hind preopercle edge. Front nostril last $\frac{2}{5}$ to $\frac{1}{3}$ in snout; simple pore; hind one short vertical slit close before front eye edge. Interorbital little convex.

Rakers iv 3+14 or 15, i, lanceolate, $1\frac{1}{4}$ in filaments, which $1\frac{1}{6}$ to $1\frac{2}{5}$ in eye. Scales large, finely ctenoid, in parallel rows above lateral line and horizontal rows below; caudal scales basal, little smaller than those on trunk; 3 rows (injured) of cheek scales; 1 or no scales behind depressed spinous dorsal tip; basal striae 5 or 6; apical denticles 142 to 187; circuli very fine; lateral line concurrent with peduncle base; tubes arborescent. Third dorsal spine $1\frac{2}{5}$ to $1\frac{1}{2}$ in head; first dorsal ray $2\frac{1}{4}$ to $2\frac{2}{5}$; second anal spine $2\frac{1}{2}$ to $3\frac{1}{10}$; first anal ray $2\frac{2}{5}$ to $2\frac{1}{2}$; caudal deeply forked, upper lobe little longer, $1\frac{1}{4}$; pectoral $1\frac{1}{3}$ to $1\frac{1}{2}$; ventral $1\frac{1}{3}$ to $1\frac{2}{5}$.

Color in alcohol dull brown generally, back with pale olive tint. Each scale above lateral line with deeper olive to dusky center, so streaks form as longitudinal lines and some examples with few traces on sides below lateral line. Opercular spot above, about level with pupil and same size, chestnut-brown. Narrow slaty-dusky lines across front of head, louped forward, correct eye, and lower ones on those from lower eye edge obliquely forward to preorbital. Slaty line from below hind eye edge obliquely forward to preorbital. Lines on front of head variable, and sometimes form irregular reticulations. Spinous dorsal pale, with dusky blotch above or at ends of fourth to sixth spines and traces of sub-basal horizontal pale dusky narrow band. Soft dorsal creamy, with 2 narrow submarginal dusky lines, lower oblique on last 2 rays, and parallel behind 4 or 5 similar short oblique lines over last half of fin. Caudal pale, with faint traces of 5 or 6 narrow oblique dusky streaks or lines on each lobe. Anal creamy, edge brownish and basal streaks more or less broken in spots. Pectoral pale, with about 7 dull brown transverse streaks. Ventral pale, except first or second rays and membrane between last 2 rays brownish. Length 160 to 270 mm. Two from Sydney, and 3 in the Academy from Melbourne included. The color notes are largely from the latter material, as the Wilkes specimens show only faint traces of the markings.

Upeneus multifasciatus (Quoy and Gaimard).

Head $2 \frac{5}{6}$ to 3; depth $3 \frac{1}{6}$ to $3 \frac{3}{5}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 27 or 28 in lateral line to caudal base and 4 more on latter; 3 scales above lateral line to spinous dorsal origin; 2 or 3 to soft dorsal origin; and 5 or 6 below to spinous anal origin; 13 predorsal scales 13; snout $1 \frac{2}{3}$ to $1 \frac{4}{5}$ in head from upper jaw tip; eye $5 \frac{1}{2}$ to 6; maxillary $2 \frac{1}{4}$ to $2 \frac{3}{5}$; interorbital $3 \frac{3}{5}$ to $3 \frac{5}{6}$.

Body elongate to rather slender, ovate, compressed, back sometimes little elevated; least depth of caudal peduncle $1 \frac{3}{5}$ to $1 \frac{4}{5}$ in its length or $2 \frac{1}{2}$ to $2 \frac{7}{8}$ in total head length. Head width $1 \frac{3}{5}$ to $1 \frac{2}{3}$ its length. Eye elevated, center about last $\frac{2}{5}$ in head. Mouth moderate, lower jaw slightly protruding. Maxillary extends about $\frac{3}{5}$ to $\frac{3}{4}$ of snout; expansion $1 \frac{1}{4}$ eye-diameters. Teeth conic, strong, rather obtuse, uniserial in jaws; no others. Barbels not quite to hind opercle edge, about $1 \frac{1}{8}$ to $1 \frac{1}{4}$ in head. Front nostril small pore about last $\frac{2}{5}$ or slightly behind middle in snout length; hind nostril short slit close before front eye edge. Interorbital convex. Opercular spine moderate, little below eye.

Rakers ~~9~~ 29 to 31, lanceolate, slightly longer than filaments or $1 \frac{1}{4}$ in eye. Scales finely ctenoid, rows parallel with lateral line; caudal scaled basally, scales nearly

large as body scales; 3 rows of cheek scales; basal radiating striae 5 to 9; apical denticles 126 to 130; circuli very fine; lateral line mostly concurrent with back, slightly elevated at first along caudal peduncle side and midway at caudal base; tubes arborescent. Third dorsal spine $1 \frac{1}{2}$ to $1 \frac{2}{3}$ in head; first dorsal ray $2 \frac{4}{5}$ to 3; second anal spine $3 \frac{1}{6}$ to $3 \frac{2}{5}$; first anal ray $2 \frac{1}{8}$ to $2 \frac{3}{4}$; caudal deeply forked, upper lobe $1 \frac{1}{5}$ to $1 \frac{2}{5}$; pectoral $1 \frac{2}{5}$ to $1 \frac{1}{2}$; ventral $1 \frac{1}{4}$ to $1 \frac{1}{3}$.

Color in alcohol of ~~Mani~~ example pale brownish generally. Pale band, little narrower than eye, from its front edge to snout tip and dark brown band from behind eye of similar width. Lips brown and edge of gill-opening dusky. Broad deep brown band from predorsal to pectoral axilla, another from between dorsals, similar one from first $\frac{2}{3}$ of soft dorsal and finally broad one across caudal peduncle. Outer hind terminal part of spinous dusky. Soft dorsal and anal dusky-brown, former with 4 pale lines on its outer portion, oblique to more horizontal than fin edge. Soft anal similar, only lines less evident. Caudal pale, upper and lower edges narrowly dusky. Pectoral pale brown. Ventral dusky-brown, with obscure dark cross-lines. Iris brown, narrow golden circle around pupil. Length to 209 mm. One from Mani and one from Tahiti. The latter faded pale brownish generally in alcohol, and still paler below. First transverse deep brownish band from below spinous dorsal base medianly, second from first half of soft dorsal base, third

blotch on caudal peduncle above. Hind edge of gill-opening and fins deep brown. Iris brown.

We have also examined a series in the Academy from Tahiti and the Hawaiian Islands. These show: Head $2 \frac{4}{5}$ to 3; depth 3 to $3 \frac{1}{5}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 27 or 28 in lateral line to caudal base and 3 more on latter; 3 scales to spinous dorsal origin, 2 or 3 to soft dorsal origin, 6 below to spinous anal origin; 12 to 14 predorsal scales; snout $1 \frac{3}{4}$ to 2 in head; eye $4 \frac{3}{5}$ (young) to $6 \frac{1}{8}$ (adult); maxillary $1 \frac{2}{5}$ to $2 \frac{1}{2}$; interorbital $3 \frac{1}{4}$ to $4 \frac{1}{8}$; head width $2 \frac{1}{4}$ to $2 \frac{2}{5}$; least depth of caudal peduncle $2 \frac{2}{3}$ to $2 \frac{3}{4}$. Eye slightly more advanced in young; jaws mostly even; front nostril more advanced in young, though not quite midway in snout. Rakers 6 + 21 in young; scales in young with 6 radiating striae and 75 apical denticles; tubes in lateral line in young trifid or quadrifid, more branched with age. Third dorsal spine $1 \frac{1}{2}$ to $1 \frac{2}{3}$ in head; first dorsal ray $2 \frac{1}{4}$ to $2 \frac{2}{3}$; second anal spine $2 \frac{4}{5}$ to 3; first anal ray $2 \frac{2}{5}$ to $2 \frac{3}{5}$; pectoral $1 \frac{1}{3}$ to $1 \frac{1}{2}$; ventral $1 \frac{1}{8}$ to $1 \frac{1}{3}$. The color pattern in all, except the smallest, which apparently greatly faded, in agreement with the above. Some examples show dusky in the axilla. Others have paler ventrals. The front edges of spinous dorsal usually blackish. Length 110 to 203 mm. (caudal damaged).

The identity of Mullus bifasciatus Lacépède with Mullus trifasciatus Lacépède was accepted by Günther and others, and more lately by Jordan and Evermann, from Hawaiian material. However, we have examined examples in the Academy from the Hawaiian Islands, of Upeneus bifasciatus (Lacépède). These show: Head 3 to $3 \frac{1}{6}$; depth 3 to $3 \frac{1}{8}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 28 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, and 7 below to spinous anal origin; 12 to 14 predorsal scales; snout $1 \frac{2}{3}$ to $1 \frac{7}{8}$ in head; eye $5 \frac{1}{6}$ to 6; maxillary $2 \frac{2}{5}$ to $2 \frac{3}{4}$; interorbital 3 to $3 \frac{1}{8}$; least depth of caudal peduncle $2 \frac{1}{4}$ to $2 \frac{3}{4}$; head width $1 \frac{7}{8}$ to 2; lips broad and fleshy; barbels about to hind preopercle edge; $1 \frac{2}{3}$ to $1 \frac{4}{5}$ in head. Rakers 8 or ~~9~~ 26 or 27; scales in 3 rows on cheek; basal radiating striae 5 to 7 and apical denticles 169 to 186. Third dorsal spine $1 \frac{2}{5}$ in head; first dorsal ray $2 \frac{2}{5}$ to $2 \frac{3}{4}$; second anal spine $2 \frac{2}{3}$ to 3; first anal ray $2 \frac{1}{6}$ to $2 \frac{2}{3}$; upper caudal lobe $1 \frac{1}{5}$ to $1 \frac{1}{4}$; pectoral $1 \frac{1}{4}$ to $1 \frac{1}{3}$; ventral $1 \frac{1}{10}$ to $1 \frac{1}{5}$. In alcohol pale brown. Back with 2 broad deep brown transverse bands, first from spinous dorsal base and second from soft dorsal base; Spinous dorsal yellowish, edged slightly with brownish to pale dusky. Soft dorsal brown, dusky to blackish terminally, with many pale waved longitudinal lines. Anal similar. Caudal

brown, dusky around edges, each lobe with many obscure transverse dusky cross lines. Pectoral yellowish, with brown base. Ventral pale brownish, edges all around pale dusky. Barbels brownish medially, tips pale. Length 243 to 273 mm.

It would thus appear that the main character separating M. bifasciatus is the pair of short barbels, exactly as shown by Lacépède, together with an entirely different color-pattern. The Tahiti example in the Wilkes' collection shows the second dark vertical band originating at front of soft dorsal base as in the specimens of U. multifasciatus, but it is unlike the latter in that the first band descend entirely from the spinous dorsal base.

Sauvage¹⁶⁵ includes Mullus multifasciatus Quoy and Gaimard¹⁶⁶ as a synonym of M. bifasciatus Lacépède¹⁶⁷. He describes the color as red, with 2 black bands opposite the dorsals, which shows it agrees with M. bifasciatus Lacépède. The latter gives a crude figure with but 2 dark vertical bands first from bases of first to third dorsal spines and about 2 scales in extent forward from spinous dorsal origin. The second blotch is from base of second dorsal fin most its extent, though neither band extends on the fin base. The barbels are shown as short, barely extended beyond the eye.

165. Hist. Nat. Madagascar, Poiss., vol. 16, 1891, p. 221.

166. Voy. Uranie, Zool., 1825, p. 330, Pl. 59, fig. 1. Oahu and Maui.

167. Hist. Nat. Poiss., vol. 3, 1802, pp. 383, 404, Pl. 14, fig. 2.

Quoy and Gaimard figure their M. multifasciatus as a very different fish. It is shown with a dark postocular blotch; another behind but predorsal, including first 3/5 of spinous dorsal base; then narrower interdorsal band; little wider band from and before first half of soft dorsal; median caudal peduncle blotch above; soft dorsal and anal each with 2 longitudinal lines; barbels little less than head or not reaching hind opercle edge. Of course this is not entirely in agreement with our examples, which are more as pictured by Jordan and Evermann¹⁶⁸. They do not show the dark predorsal band or the lines on the soft dorsal, the dark interdorsal, and band following from front of soft dorsal, and all much narrower than in our examples.

¹⁶⁸

Bull. U.S. Fish Com., vol. 23, pt. 1, 1903 (1905), p. 256.

Sauvage, under the name of Upeneoides vittatus¹⁶⁹, shows a fish very close to both Jordan and Evermann's figure and our Maui specimen. It differs largely in its pale color, doubtless due to preservation, immaculate soft dorsal and anal and ventral not darker than other fins and lack of small scales on caudal lobes.

¹⁶⁹

Hist. Nat. Madagascar, Poiss., vol. 16, 1891, p. 219, Pl. 27, fig. 2.

Mullus trifasciatus Lacépède¹⁷⁰ is crudely figures.

Its first dark band includes first 4 dorsal spines, well back, though not quite to base of fifth spine; second band in front of soft dorsal base; third on caudal peduncle medially. The barbels are quite long and shown as reaching back $2/3$ of depressed ventral.

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Hist. Nat. Poiss., vol. 3, 1802, pp. 383, 404, Pl. 15, fig. 1.

Upeneus pleurostigma Bennett.

Head 3 to $3 \frac{1}{3}$; depth $3 \frac{2}{5}$ to $3 \frac{1}{2}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 28 in lateral line to caudal base and 2 or 3 more on latter; 2 or 3 scales above lateral line to spinous dorsal origin, same to soft dorsal origin, and 6 below to spinous anal origin; 13 or 14 predorsal scales; snout $1 \frac{1}{3}$ to 2 in head; from upper jaw tip; eye $4 \frac{1}{4}$ to 5; or $2 \frac{1}{6}$ to 3 in snout; maxillary $2 \frac{3}{5}$ to $3 \frac{1}{5}$ in head from upper jaw tip; interorbital $3 \frac{2}{5}$ to $3 \frac{7}{8}$.

Body elongate, compressed, back little elevated; least depth of caudal peduncle about 2 to $2 \frac{1}{6}$ in its length. Head width $2 \frac{1}{10}$ to $2 \frac{1}{4}$ in its length. Snout compressed, width $1 \frac{2}{5}$ to $1 \frac{3}{5}$ in its length. Eye elevated, hind pupil edge about last $2/5$ in head length. Mouth moderate, jaws even or lower jaw slightly protruded. Maxillary about $2/3$ to $\frac{3}{4}$ in snout, $2/3$ in young; expansion equals eye. Teeth conic, strong,

rather obtuse, uniserial in jaws; no others. Barbels to hind preopercle edge, $1 \frac{2}{5}$ in head. Front nostril small pore, midway in snout; hind nostril short slit close before front eye edge. Interorbital convex. Opercular spine moderate, about level with lower eye edge.

Rakers $7 + 21$ to 23, lanceolate, about $\frac{4}{5}$ of filaments, which $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in eye. Scales finely ctenoid, in even longitudinal rows, parallel with lateral line; caudal largely with small scales, those basal nearly large as body scales; 3 rows of scales in cheek; basal radiating striae 5 or 6; apical denticles 92 to 156; circuli very fine; lateral line mostly concurrent with back, slightly elevated at first along caudal peduncle side; tubes arborescent, 4 to 7 branches usually above. Third dorsal spine $1 \frac{2}{5}$ to $1 \frac{4}{5}$ in head; first dorsal ray $2 \frac{4}{5}$; second anal spine 3 to $3 \frac{2}{3}$; first anal ray $2 \frac{2}{5}$ to $2 \frac{4}{5}$; caudal deeply forked, lower lobe about $1 \frac{1}{5}$ to $1 \frac{1}{3}$?; pectoral $1 \frac{1}{3}$ to $1 \frac{2}{5}$; ventral $1 \frac{1}{8}$ to $1 \frac{1}{3}$.

Color in alcohol faded pale brownish, lower surface much paler. Dark brown nebulous blotch on lateral line below last dorsal spine about size of eye and behind it an elongate yellowish blotch for about 4 scales width. Soft dorsal brownish; with 5 or 6 longitudinal pale waved lines on outer portion. Anal pale, with about 4 longitudinal whitish bands, broader than on soft dorsal. Smaller example much paler and largely yellowish on sides and below. One from Maui, 205 mm. We also include an example 123 mm. long from the Hawaiian Islands, in the Academy.

Upeneus janseni Bleeker.

Head 3; depth $3 \frac{1}{5}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 23 in lateral line to caudal base and 3 more on latter; 3 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin and 7 below to spinous anal origin; about 13 predorsal scales; snout 2 in head; eye $4 \frac{1}{3}$ or $2 \frac{1}{3}$ in snout; maxillary $2 \frac{1}{3}$ in head; interorbital $3 \frac{4}{5}$.

Body elongate, compressed, back little elevated forward; least depth of caudal peduncle 2 in its length or 3 in head. Head width $2 \frac{1}{4}$ in its length. Snout compressed, width $1 \frac{2}{5}$ in its length. Eye elevated, front pupil edge about midway in head length. Mouth moderate, jaws about even. Maxillary not quite to hind nostril; expansion almost equals eye. Teeth conic, strong, rather obtuse, uniserial in jaws; no others. Barbels reach about midway in opercle, not to its hind edge, $1 \frac{1}{16}$ in head. Front nostril small pore about first $\frac{2}{5}$ in snout; hind nostril small vertical slit close before front eye edge. Interorbital convex. Opercular spine moderate, about level with lower eye edge.

Rakers II, 5+21, lanceolate, about $\frac{7}{8}$ of filaments, which $1 \frac{1}{3}$ in eye. Scales finely ctenoid, in even longitudinal rows parallel with lateral line; caudal largely with small scales and basally nearly large as body scales; 3 rows of cheek scales; 2 scales behind depressed spinous dorsal; basal radiating striae 6; apical denticles $1 \frac{4}{6}$;

Circuli very fine; lateral line mostly concurrent with dorsal profile, slopes obliquely down on caudal peduncle side to middle of caudal base; tubes with very short branches, few or little developed on posterior scales. Third dorsal spine $1 \frac{2}{3}$ in head; first dorsal ray $2 \frac{7}{8}$; second anal spine $4 \frac{1}{2}$?; caudal well forked, upper lobe $1 \frac{1}{3}$; pectoral $1 \frac{3}{5}$; ventral $1 \frac{1}{2}$. Color faded dull brownish in alcohol, fins all brownish, dorsals pale. Length 198 mm. One from the Pacific?, possibly the Philippines.

This species was originally described with the head 4 in total length (including caudal) and depth 5, while our example shows head $3 \frac{7}{8}$ and depth $4 \frac{1}{3}$. The height of spinous dorsal was given as $1 \frac{2}{3}$ in body, while our example shows $1 \frac{2}{5}$. Bleeker's figure¹⁷¹ varies in showing head $3 \frac{3}{5}$ in total length, depth $4 \frac{4}{5}$, the long maxillary, proportion of the eye, rather small dorsal fin with third spine longest, moderate ventral, depressed dorsal with 2 scales between its tip and soft dorsal origin. Although the lateral line is shown with apparently more branches than our example, this may be the artist's oversight. Jordan and Evermann figure the type of Upeneus preorbitalis Smith and Swain, and show the lateral line without any branches.¹⁷² From their figure it would otherwise appear allied, though it is shown with second dorsal spine largest, apparently 5 scales between depressed spinous dorsal tip and soft dorsal origin. The disagreement in the much shorter maxillary, given as

171 Atlas Ich. Ind. Neerl., vol. 9, 1877, Pl. 392, fig. 4.

172 Bull. U.S. Fish Com., vol. 23, part 1, 1903 (1905), p. 263, fig. 111.

3 in the head, is indicated as reaching about $2/3$ to eye in their drawing, though apparently partly protracted, thus allowance in all fairness could be made for its reaching much closer to the eye. The scales are given as 37, of which apparently 2 on caudal base according to the figure, which would appear the main distinctive character.

Upeneus barberinus (Lacépède).

Head $2 \frac{4}{5}$ to 3; depth $3 \frac{3}{5}$ to $3 \frac{3}{4}$; D. VIII - I, 8, i; A. II, 6, i; scales 27 to 30 in lateral line to caudal base and 2 more on latter; 12 or 13 scales above lateral line to spinous dorsal origin, 2 or 3 above to soft dorsal origin; 6 below to spinous anal origin; 13 or 14 predorsal scales; snout $1 \frac{4}{5}$ to $1 \frac{7}{8}$ in head; eye $4 \frac{2}{5}$ to $4 \frac{3}{4}$; maxillary $3 \frac{1}{8}$ to $3 \frac{1}{4}$; interorbital $4 \frac{1}{8}$ to $4 \frac{1}{6}$.

Body elongate, rather slender, back slightly elevated, compressed; least depth of caudal peduncle about half its length or $2 \frac{3}{4}$ to $2 \frac{4}{5}$ in head. Head width $2 \frac{1}{5}$ to $2 \frac{2}{5}$ its length. Snout conic, profile slightly concave just before tip; width $1 \frac{2}{3}$ to $1 \frac{3}{4}$ its length. Eye elevated, close to upper profile of head, front edge about midway in head. Mouth small, lower jaw slightly included. Maxillary extends beyond front nostril, $\frac{1}{2}$ to $3/5$ of snout; expansion $1 \frac{1}{5}$ to $1 \frac{1}{4}$ in eye.

Teeth conic, strong, obtuse, uniserial in jaws; no others. Barbels to hind preopercle edge, $1 \frac{1}{3}$ in head. Front nostril small pore, slightly before center in snout length; hind nostril short vertical slit close before front eye edge. Interorbital slightly convex. Opercle spine moderate, about level with lower pupil edge.

Rakers ~~6~~ 21, lanceolate; $1 \frac{1}{2}$ in filaments or 2 in eye. Scales finely ctenoid, in even longitudinal rows parallel with lateral line; caudal largely covered with small scales, and basally but little smaller than on body; 3 rows of cheek scales; basal radiating striae 5, with 1 or 2 grooves extending apically; apical denticles 99 to 105; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high at first along caudal peduncle side to caudal base medially; tubes arborescent, or 2 to 6 branches above, mostly fewer behind. Third dorsal spine $1 \frac{2}{3}$ in head; first dorsal ray $2 \frac{1}{4}$; second anal spine 3; first anal ray $2 \frac{1}{4}$; caudal well forked, upper lobe $1 \frac{1}{8}$; pectoral $1 \frac{1}{2}$ to $1 \frac{3}{5}$; ventral $1 \frac{2}{5}$.

Color in alcohol back pale olive brown, sides and below pale yellowish-brown. Dark band from each side of snout tip to eye, little wider than pupil but not so wide as eye, then back and parallel along back to lateral line, finally leaving its course and ends on back below last dorsal rays. Deep brown blotch on caudal peduncle just before caudal base medianly, about size of eye. Fins faded pale brown. Length 11 to 152 mm. One from "Singapore or Polynesia", and another without locality, possibly from Fiji?

Upeneus porphyreus Jenkins

Head 3; depth $2 \frac{7}{8}$ to $3 \frac{1}{5}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 26 to 29 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 7 below to spinous anal origin; 13 to 15 predorsal scales; snout 2 to $2 \frac{1}{4}$ in head; eye $3 \frac{2}{5}$ to $4 \frac{1}{8}$; maxillary $2 \frac{2}{5}$ to $2 \frac{3}{5}$; interorbital $3 \frac{1}{3}$ to $3 \frac{7}{8}$; eye 2 in snout.

Body elongate, back little elevated, compressed; least depth of caudal peduncle $1 \frac{1}{2}$ to $1 \frac{3}{4}$ its length or $2 \frac{2}{5}$ to $2 \frac{3}{5}$ in head. Head width $1 \frac{3}{4}$ to $2 \frac{1}{8}$ its length. Snout conic, little compressed, width $1 \frac{1}{5}$ to $1 \frac{2}{5}$ its length. Eye elevated, close to upper profile, front pupil edge about midway in head or eye center midway in young.. Mouth moderate, lower jaw included. Maxillary to hind nostril, apparently nearly to eye in young; expansion $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in eye. Teeth conic, strong, rather obtuse, uniserial in jaws; no others. Barbels flexible, not quite to hind preopercle edge, $1 \frac{1}{2}$ to $1 \frac{2}{3}$ in head. Front nostril small pore midway in snout; hind nostril small vertical slit close before front eye edge. Interorbital nearly level. Opercle spine moderate, about level with lower pupil edge.

Rakers 6 to 8 21 to 26, lanceolate, $1 \frac{1}{6}$ to slightly longer than filaments or $1 \frac{3}{4}$ to 2 in eye. Scales finely ctenoid, in even longitudinal rows parallel with lateral line; caudal largely covered with small scales; 3 rows of cheek scales; basal radiating striae 5 or 6, and 1 to 3

joined medianly and extend apically; apical denticles 113 to 130, about 60 in young; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high at first along caudal peduncle side to caudal base medianly; tubes arborescent, 3 to 9 branches above, 1 to 4 in young. Third dorsal spine $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in head; first dorsal ray $1 \frac{7}{8}$ to $1 \frac{8}{10}$; second anal spine $2 \frac{2}{3}$ to $2 \frac{9}{4}$; first anal ray $1 \frac{4}{5}$ to 2; caudal well forked, upper lobe $1 \frac{1}{8}$ to $1 \frac{1}{10}$; pectoral $1 \frac{1}{3}$ to $1 \frac{1}{2}$; ventral $1 \frac{1}{5}$ to $1 \frac{1}{4}$.

Color in alcohol faded dull brownish generally. Smaller example dull brown above, sides and below pale yellowish-brown. One scale behind soft dorsal for $2 \frac{1}{2}$ scales each side of median dorsal row on caudal peduncle, conspicuous pale or yellowish-white spot. Both before and behind, though of larger extent, obsolete brownish saddle-like blotch. Soft dorsal and anal each with median longitudinal obsolete brownish band; fins otherwise pale. Each caudal lobe shows traces of several obsolete brown cross-bars. Ventral pale, with slight brownish median shade in larger example. Both have pale pectorals. Length 68 to 168 mm. One from "Singapore" or "Polynesia" and another without data, though likely all really Hawaiian? We also include a Hawaiian example in the Academy.

Though Jordan and Evermann state that in life the fins all rosy or clear red, their figure of the type shows the soft dorsal with submarginal dark streaks on the membranes parallel

with the rays ¹⁷³. In both our examples the median horizontal brown band though pale, is quite distinct. The large light or whitish spot behind the soft dorsal is especially characteristic in the alcoholic specimen, and equally conspicuous in the young and adult.

Upeneus pleurospilos Bleeker.

Colored figure without data.

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Bull U.S.Fish Com., vol. 23, part 1, 1903(1905), p. 262, fig. 110.

Mulloidides samoensis (Günther).

Head $3\frac{1}{4}$; depth $4\frac{1}{8}$ to $4\frac{2}{3}$; D. VIII - I, 8, 1; A. II, 6, 1; scales 35 to 37 in lateral line to caudal base and 3 more on latter; 2 or 3 scales above lateral line to spinous dorsal origin, 5 below to spinous anal origin; 14 to 17 (pockets) predorsal scales; snout $2\frac{1}{10}$ to $2\frac{3}{5}$ in head; eye $3\frac{7}{8}$ to $4\frac{1}{10}$; maxillary $3\frac{1}{6}$ to $3\frac{1}{4}$; interorbital 3 to $3\frac{7}{8}$.

Body slender, compressed; least depth of caudal peduncle $2\frac{1}{2}$ in its length or $3\frac{1}{4}$ to $3\frac{1}{3}$ in head. Head width $2\frac{1}{5}$ to $2\frac{1}{4}$ its length. Snout convex, sides flattened, width $1\frac{1}{5}$ its length. Eye large, elevated, close to upper profile; front pupil edge slightly before center in head length; or about midway in head in young. Mouth small, jaws even.

Maxillary reaches $2/3$ to eye; expansion $1 \frac{3}{5}$ in eye. Teeth small, conic, simple biserial above, quadriserial below; fewer and larger teeth in young; no teeth on mouth roof or tongue. Front nostril at last $2/5$ in snout; hind nostril short vertical slit close before eye. Interorbital level, slightly depressed medianly. Opercle spine about opposite lower third of eye.

Rakers iii, 5 + 13, vi, lanceolate, 2 in filaments, which $1 \frac{3}{4}$ in eye. Scales finely ctenoid; in even longitudinal rows parallel with lateral line; caudal largely with small scales, basally nearly large as body scales; 3 rows of cheek scales; basal radiating striae 5 to 7, and 1 or 2 sometimes extend apically; apical denticles 123 or 124, about 65 in young; circuli very fine, coarser in young; lateral line concurrent with dorsal profile, high at first along caudal peduncle side until midway at caudal base; tubes arborescent, large ones less so, and 10 to a dozen branches above, not more than 3 or 4 in young, usually fewer. Second dorsal spine $1 \frac{1}{2}$ to $1 \frac{3}{4}$ in head; first dorsal ray $2 \frac{1}{3}$; second anal spine $4 \frac{1}{8}$ to 5; first anal ray $2 \frac{3}{5}$; caudal deeply forked, $1 \frac{1}{3}$; pectoral $1 \frac{1}{2}$ to $1 \frac{2}{3}$; ventral $1 \frac{2}{5}$ to $1 \frac{3}{4}$. Color in alcohol dull brown, scarcely paler below. Traces of brownish blotch faintly above last fourth of depressed pectoral. Length 96 to 243 mm. One from Singapore or Polynesia and another without locality.

Also a very small one from Maui, 40 mm. long, has about 32 scales in lateral line to caudal base. We include 2 examples in the Academy from Samoa.

GERRIDAE.

Eucinostomus pseudogula Poey.

Head $3 \frac{1}{5}$; depth $2 \frac{2}{3}$; D. IX, 10, 1; A. III, 7, 1; tubular scales 46 in lateral line to caudal base and 2 more on latter; 6 scales above lateral line to spinous dorsal origin, 4 above to soft dorsal origin; 10 below to spinous anal origin; 22 predorsal scales; snout $3 \frac{1}{8}$ in head; eye $3 \frac{1}{5}$; maxillary $2 \frac{7}{8}$, interorbital $2 \frac{4}{5}$.

Body elongately ellipsoid, back little elevated, compressed; least depth of caudal peduncle $1 \frac{1}{6}$ its length or $2 \frac{7}{8}$ in head. Snout conic, nearly long as wide. Eye little elevated, long as snout and center very slightly advanced in head length. Mouth rather small, lower jaw little shorter, Maxillary slightly beyond front eye edge, not to pupil; expansion 3 in eye. Lips tough. Teeth fine, villiform, in bands in jaws. Nostrils together, hind one larger, front one above last third in snout. Interorbital broadly convex. Preorbital and preopercle edges entire.

Rakers vi, 4+7, 1, short rudimentary points, about $\frac{1}{3}$ of filaments, which $\frac{2}{3}$ in eye. Scales cycloid, in even longitudinal rows, upper parallel with lateral line and lower

horizontal; broad scaly dorsal and anal sheaths; axillary ventral scaly flap half of fin; caudal scaly basally, fine scales out over most of lobes, also over lower surfaces of ventrals as depressed; cheek with 3 rows of scales to preopercle ridge and several scales on flange above angle; muzzle naked, squamous area reaching to hind nostril and naked median area nearly closed in front by approximating scales; basal radiating striae 5; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high along front of caudal peduncle, midway at caudal base; tubes small, simple. Second dorsal spine $1 \frac{4}{5}$ in head; second anal spine 4, third 3; upper caudal lobe (tip damaged) $1 \frac{1}{3}$; pectoral(damaged) apparently little longer than head; ventral $1 \frac{2}{3}$. Faded brownish in alcohol, back somewhat olive. Sides below level of upper eye edge pale, with silvery tints. Iris and fins all brownish, upper edge of spinous dorsal dusky. Length 130 mm. (caudal damaged). Rio Janeiro.

We have also examined 2 in the Academy from Rio Janeiro, which show: Head 3 to $3 \frac{1}{10}$; depth 3 to $3 \frac{1}{8}$; D.IX, 10, 1; A.III, 7, 1; scales 46 or 47 in lateral line to caudal base and 4 or 5 more on latter; 6 scales above lateral line to spinous dorsal origin; 4 to soft dorsal origin, 10 or 11 below to spinous anal origin; 22 to 24 predorsal scales; snout $3 \frac{1}{8}$ to $3 \frac{1}{5}$ in head; eye $3 \frac{1}{8}$ to $3 \frac{1}{5}$; maxillary 2 to $2 \frac{4}{5}$; interorbital $3 \frac{1}{5}$ to $3 \frac{1}{4}$. Third anal spine $3 \frac{2}{5}$ to $4 \frac{1}{8}$ in head. Premaxillary groove evenly wide in front, scales not approximating. Length 113 to 150 mm.

Eucinostomus melanopterus (Bleeker).

Head $3 \frac{1}{5}$; depth 3; D. IX, 10, 1; A. III, 7, 1; scales (pockets) about 40 in lateral line to caudal base and 5 more on latter; 4 scales above lateral line to soft dorsal origin, 8 below to spinous anal origin; 18 predorsal scales; snout 3 in head; eye $2 \frac{7}{8}$; maxillary $2 \frac{7}{8}$; interorbital $3 \frac{1}{6}$; third anal spine $3 \frac{1}{3}$; second anal spine $3 \frac{1}{2}$; lower caudal lobe $1 \frac{1}{3}$; rakers 5+8 short points. In alcohol back gray-brown where scales have fallen, side and below silvery-white. Iris pale brown. Spinous dorsal brownish, whitish medially and end black, obsolete horizontal band below whitish area composed of minute brownish points; other fins all dull brown. Length 173 mm. Cape Verde Islands.

This species does not previously appear to have been recorded from the Cape Verde Islands. It agrees with the Ashantee material recorded by Fowler.

E. barengulus Goode and Bean is apparently synonymous, as a comparison with a series of Bermuda examples in the Academy show. The latter, however, do not exhibit any traces of the horizontal dark bar. In a smaller example from Santo Domingo, in the Academy, it is very distinct, and this individual agrees in every way with the Cape Verde material. The Bermuda specimens show a heavier and longer second anal spine, $2 \frac{1}{2}$ to $2 \frac{9}{10}$ in head. In the Cape Verde example the scales have 7 radiating striae.

From E. gula (Quoy and Gaimard). This species is clearly distinguished by the color of the soft dorsal, which is white with a black end and dark transverse or horizontal band. The squamous area on the muzzle does not enclose a median naked area as in the Florida specimen of E. gula before us.

Xystaena ~~ma~~ kapas (Bleeker).

Head $3 \frac{1}{6}$; depth $2 \frac{1}{2}$; D. IX, 10, i; A. III, 7, i; scales 38 in lateral line to caudal base and 5 more on latter; 5 scales above lateral line to spinous dorsal origin, 4 above to soft dorsal origin, 9 below to spinous anal origin; 19 predorsal scales; snout 3 in head; eye 3; maxillary $2 \frac{1}{2}$; interorbital $2 \frac{2}{3}$.

Body elongately ellipsoid, compressed, back slightly elevated; least depth of caudal peduncle $1 \frac{1}{4}$ its length or $2 \frac{2}{3}$ in head. Head width $1 \frac{9}{10}$ its length. Snout conic, about long as broad. Eye little elevated, center slightly before head center. Mouth small, jaws about even, Maxillary slightly beyond front eye edge, not to pupil; expansion $2 \frac{1}{3}$ in eye. Lips tough. Teeth fine, villiform, in bands in jaws. Nostrils together, hind one little larger, front one about last $\frac{2}{5}$ in snout. Interorbital broadly convex, depressed forward and medianly. Preopercle and preorbital entire.

Rakers $2+8$, short rudimentary points, about $1 \frac{1}{2}$ of filaments, which 2 in eye. Scales cycloid, in even longitudinal rows, upper parallel with lateral line and lower horizontal;

broad scaly dorsal and anal sheaths; axillary ventral scale flap at least $3/4$ of fin; caudal scaly basally, fine scales out over most of lobes, also over lower ventral surfaces as depressed; cheeks with 3 rows of scales to preopercle ridge and fourth row on flange; muzzle naked, squamous area beginning opposite front eye edge and naked median triangular area forms rather broad angle; basal radiating striae 7; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high along front of caudal peduncle side at first; median at caudal base; tubes simple, well exposed. Third dorsal spine $1 \frac{2}{3}$ in head; third anal spine $2 \frac{3}{5}$; caudal well forked; pectoral and ventral greatly damaged, though former apparently less than head. In alcohol back dull olive, sides and below pale brownish with silvery reflections. Fins and iris all dull brownish. No markings. Length 113 mm. Fiji.

We have also examined 4 Philippine examples in the Academy, which show: Head $3\frac{1}{4}$, or $2 \frac{3}{5}$ to $2 \frac{7}{8}$ in young; depth $2 \frac{2}{3}$, or $2 \frac{1}{3}$ to $2\frac{1}{2}$ in young; D. IX, 10, 1; A. III, 7, 1; scales 40 to 43 in lateral line to caudal base, and 2 or 3 more on latter; 5 scales above lateral line to spinous dorsal origin; 4 to soft dorsal origin; 9 below to spinous anal origin; 20 predorsal scales; snout $3 \frac{1}{10}$ in head, $3\frac{1}{2}$ to $3 \frac{2}{5}$ in young; eye $3\frac{1}{2}$, $2 \frac{4}{5}$ to 3 in young; maxillary $2\frac{1}{2}$; $2 \frac{4}{5}$ to 3 in young; interorbital $2\frac{1}{2}$, $3 \frac{1}{8}$ to $3\frac{1}{2}$ in

young; basal radiating striae 8, 4 in young; length 43 to 175 mm. (caudal tips damaged).

Xystaena gigas (Günther).

Head 3 to $3\frac{1}{4}$; depth $2\frac{7}{8}$ to $3\frac{2}{5}$; D. IX, 10. 1, once 9, 1; A. III, 7, 1; scales 40 or 41 in lateral line to caudal base and 4 more on latter; 5 or 6 scales above lateral line to spinous dorsal origin, 4 or 5 above to soft dorsal origin, 9 or 10 below to spinous anal origin; 23 to 29 predorsal scales; snout $2\frac{7}{8}$ to $3\frac{1}{8}$ in head; eye $3\frac{1}{8}$ to $3\frac{2}{5}$; maxillary $2\frac{3}{5}$ to $2\frac{7}{8}$; interorbital $2\frac{7}{8}$ to $3\frac{1}{4}$.

Body elongately fusiform, compressed, back not elevated; least depth of caudal peduncle $1\frac{1}{4}$ to $1\frac{1}{2}$ its length or $2\frac{4}{5}$ to $3\frac{3}{5}$ in head. Head width 2 to $2\frac{1}{8}$ its length. Snout conic, long as wide. Eye slightly ellipsoid, little elevated, hind pupil edge very slightly behind center in head length. Mouth small, jaws about even. Maxillary slightly beyond front eye edge, not to pupil; expansion $2\frac{2}{5}$ to $2\frac{3}{4}$ in eye. Lips coriaceous. Teeth fine, villiform, in rather narrow bands in jaws. Nostrils moderate, together, and front one little before last fourth in snout. Interorbital broadly convex, with slight median depression. Preopercle and preorbital entire.

Rakers 6+7 short rudiments, 2 in filaments, which $2\frac{1}{2}$ in eye. Scales cycloid, in even longitudinal rows, upper parallel with lateral line, lower horizontal; broad scaly dorsal and anal basal sheaths; axillary ventral scaly flap $2\frac{1}{3}$ to $3\frac{1}{4}$ of

central; caudal scaly basally, fine scales out over most of lobes, also over ventral fins below or on lower surfaces as depressed; cheek with 3 rows of scales to preopercle ridge; muzzle naked, squamous area beginning with moderate sized scales midway between hind nostril and eye, and naked median area back until opposite eye center, first third in eye in adult; basal radiating striae 5 or 6; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high along caudal peduncle side at first, soon horizontal and midway to caudal base; tubes simple, well exposed. Second dorsal spine $1\frac{1}{2}$ to $1\frac{7}{8}$ in head; second anal spine $2\frac{7}{8}$ to 3; caudal well forked, little less than head (damaged); pectoral at least to vent, apparently little shorter in smaller examples, 1 to $1\frac{1}{8}$; ventral $1\frac{1}{2}$ to $1\frac{7}{8}$.

Color in alcohol faded dull brownish generally, back pale olive, sides and below whitish, with silvery tint. Outer portions of membranes of spinous dorsal dusky. Fin and iris all pale brownish. Length 83 to 180 mm. One from each of the following localities, Samoa, Tongatalu and Fiji. Another example, without data, is likely Polynesian?

Gunther's figure of Gerres gigas¹⁷⁴ shows the preopercle flange naked, whereas in our examples it is scaled. Also

¹⁷⁴

Journ. Mus. Godeffroy, I, 1873, Pl. 24, fig. a

Günther does not show the caudal covered with fine or small scales as in all our material.

X. argyreum (Schneider). is said to be closely related to the present species. According to Jordan and Seale "X. gigas is more silvery and has more distinct streaks along the rows of scales. In X. gigas the snout is longer than the eye; the body is more elongate, and the head proportionately longer". Owing to the state of preservation of our material these characters are of little value in comparison. The figure of Gerres argyreus of Klunzinger¹⁷⁵ shows the cheek with only 2 rows of scales, and the eye apparently little shorter than snout.

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Fische Roth. Meer., 1884, p. 48, Pl. 13, fig. 3.

Klunzinger's figure of G. oyena¹⁷⁶ shows a slender fish, certainly very close to X. gigas, eye about long as snout, hind caudal edge not dark and frontal squamation like our examples of X. gigas. Klunzinger also shows 3 rows of cheek scales, though none on preopercle flange. Day's figure¹⁷⁷ certainly represents a different fish as its hind caudal edge is shown blackish, and body depth barely half its length to caudal base. Its snout and eye, and cheek scales are in agreement with Klunzinger. Bleeker figures an example a little more elongate than Day, the hind caudal edge

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Fische Roth. Meer., 1884, 49, Pl. 5, fig. 1-a.

177

Fishes of India, pt. 1, 1875, Pl. 25, fig. 4.

dark, eye about long as snout, but 3 rows of scales on cheek and ventral bases apparently too advanced.

Gerres brasiliianus Cuvier.

Head $3\frac{1}{4}$; depth $2\frac{1}{4}$; D. IX, 10, 1; A. III, 7, 1; scales 36 in lateral line to caudal base and 2 more on latter; 6 scales above lateral line to spinous dorsal origin, 5 above to soft dorsal origin and 11 below to spinous anal origin; about 17 enlarged predorsal scales to occiput and 37 more small ones anteriorly, until opposite front eye edges; snout $3\frac{1}{3}$ in head from upper jaw tip; eye $3\frac{1}{2}$; maxillary $2\frac{3}{4}$; interorbital $3\frac{1}{4}$.

Body deeply ovoid, back elevated forward, compressed; least depth of caudal peduncle $1\frac{1}{6}$ its length or $2\frac{2}{3}$ in total head length. Head width half its length. Snout conic, length about $\frac{7}{8}$ its width. Eye rather ellipsoid, little elevated, hind pupil edge very slightly advanced before head center. Mouth moderate, lower jaw very slightly protruding. Maxillary to front pupil edge; expansion $2\frac{4}{5}$ in eye. Teeth fine, conic, in narrow bands in jaws. Lips coriaceous. Nostrils large, together, close before eye, hind one larger and from one about last fourth in snout. Interorbital broadly convex. Preopercle and preorbital edges finely serrated.

Rakers $20+11$, lanceolate, short $2\frac{1}{2}$ in filaments, which $1\frac{4}{5}$ in eye. Scales cycloid, in even longitudinal rows, upper parallel with lateral line and lower horizontal; broad scaly

basal dorsal and anal sheaths, former of very large uppermost marginal row of scales and basally many small scales; anal with 2 rows of subequal scales and many small ones about bases; axillary ventral scaly flap 2 in ventral; caudal scaly, basally scales little smaller than on caudal peduncle while other scales very small; cheek with 4 rows of large scales to preopercle edge, and 8 or 9 very small rows of suborbital scales; preopercle limb with small scales; muzzle naked, squamous area beginning with small scales convexly opposite hind nostrils; ventral covered with small scales; basally radiating striae 5; circuli very fine; lateral line largely concurrent with dorsal profile, slopes little high along caudal peduncle at first, soon horizontal and midway to caudal base; tubes simple, well exposed. Second dorsal spine $1\frac{9}{4}$ in head; first dorsal ray $2\frac{2}{3}$; second anal spine $1\frac{2}{5}$; first anal ray $1\frac{9}{10}$; caudal forked, lower lobe $1\frac{1}{6}$; pectoral (tip damaged) $1\frac{1}{6}$; ventral $1\frac{2}{5}$.

Color faded dull brassy-brown, in alcohol, scarcely paler below; each row of scales on trunk with broad deeper brown median longitudinal band, 6 above lateral line and 10 below, though lower of latter region pale; fins all deep brown, evidently due to preservation. Iris brown. Length 205 mm. One without locality, likely from Rio Janeiro?

Upon comparison with G. plumieri Cuvier from Santo Domingo and Porto Rico, the material in the Academy, the second dorsal spine is seen to be much shorter, likewise second anal spine. The West Indian specimens show: Head 3 to $3 \frac{1}{5}$; depth 2 to $2 \frac{1}{10}$; D. IX, 10, 1; A. III, 8, 1; scales 36 in lateral line to caudal base and 3 more on latter; 6 scales above lateral line to spinous dorsal origin; 10 below to spinous anal origin; 18 to 24 predorsal scales; snout $3 \frac{1}{6}$ to $3 \frac{1}{5}$ in head; eye $3 \frac{2}{5}$ to $3 \frac{7}{8}$; maxillary $2 \frac{1}{2}$ to $2 \frac{3}{4}$; interorbital $3 \frac{1}{10}$ to $3 \frac{1}{6}$; second dorsal spine 1 to $1 \frac{1}{8}$; second anal spine $1 \frac{1}{10}$ to $1 \frac{1}{6}$; pectoral $1 \frac{1}{10}$ to $1 \frac{1}{8}$; reaches anal origin; ventral $1 \frac{1}{10}$; rakers ~~23~~+13. Scales with 2 or 3 complete radiating striae, and 2 or 3 more in complete medianly; circuli very finely concentric; basal scaly anal sheath with outer row of scales enlarged or much longer than basal row; cheek scales in 3 rows, without small suborbital scales or similar ones about bases of cheek scales and on preopercle flange; naked frontal area extends as triangle until opposite eye center. In most other respects and in coloration it agrees with G. brasiliensis.

anal ray $1 \frac{1}{3}$ to 2; pectoral $1 \frac{1}{5}$ to $1 \frac{2}{5}$; ventral $1 \frac{1}{4}$
to $1 \frac{1}{3}$. In alcohol dull brown generally, mostly uniform.

Fins all brown. Length 31 to 98 mm., Six, without data, ~~likely~~

~~from Peru~~ Two figures by Richard, from
Callao and Peru respectively.

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ARRIPIDAE.

Arripis trutta (Schneider). *Fig. 188.*

Head $3 \frac{1}{5}$ to $3 \frac{1}{2}$; depth $3 \frac{3}{5}$ to $3 \frac{7}{8}$; D. IX, 16, 1 to 18, 1; A. III, 10, 1; scales 50 or 51 in lateral line to caudal base and 5 non-tubular scales on latter; 6 scales above lateral line to spinous dorsal origin; 11 below to spinous anal origin; 21 or 22 predorsal scales to occiput; snout $3 \frac{2}{5}$ to $3 \frac{4}{5}$ in head from upper jaw tip; eye $4 \frac{2}{5}$ to $4 \frac{7}{8}$; maxillary $2 \frac{1}{8}$ to $2 \frac{1}{5}$; interorbital 3 to $3 \frac{1}{5}$.

Body elongately fusiform, compressed; least depth of caudal peduncle $1 \frac{2}{5}$ to $1 \frac{2}{3}$ in its length or $3 \frac{1}{2}$ to $3 \frac{4}{5}$ in total head length. Head width $1 \frac{7}{8}$ to $2 \frac{1}{10}$ its length. Snout convex, length $1 \frac{1}{8}$ to $1 \frac{1}{5}$ its width. Eye round, center at first third in younger examples or slightly backward, in head, without mandible, in older examples; adipose eyelid broad behind, where covering $\frac{1}{5}$ of eye. Mouth large lower jaw well protruded. Maxillary to hind pupil edge; expansion $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in eye. Teeth simple, pointed, rather slender, in bands in jaws, on vomer and palatines. Nostrils adjoining, fall at last $\frac{2}{5}$ in snout, hind one twice size of front. Interorbital broad, flattened or depressed, so profile above concave. Few obsolete short points along lower preopercle

edge and broad flange to ridge horizontally striate.

Rakers $14+22$, slender, lanceolate, $1\frac{1}{8}$ in eye; filaments 1 to $1\frac{1}{4}$ in rakers. Scales in even longitudinal rows, parallel with lateral line above, horizontal below; smaller scales from broad sheath along dorsal and anal bases; caudal covered largely with small scales; small scales along body edges; basal striae 3 to 7; thin, narrowly triangular cutaneous apical points 23 to 27; circuli rather coarse; 4 rows of cheek scales; lateral line parallel with dorsal profile, high, slopes evenly from shoulder, little high along caudal peduncle side; reaches caudal base medianly; slender tubes simple. Fourth dorsal spine $1\frac{4}{5}$ to $2\frac{1}{8}$ in head; first dorsal ray $3\frac{1}{5}$ to $3\frac{1}{2}$; third anal spine $4\frac{1}{8}$ to $4\frac{1}{5}$; first anal ray $2\frac{9}{10}$ to $3\frac{1}{3}$; lower caudal lobe $1\frac{1}{10}$ to $1\frac{1}{6}$; pectoral $1\frac{4}{5}$ to 2; ventral $1\frac{2}{4}$ to $1\frac{9}{10}$.

Color in alcohol brassy-brown generally, back with olive or tinge and narrow dark slaty vertical bars or lines, alternate ones slightly broken or as spots. Fins pale brown, also iris. Length 250 to 268 mm. Two from New Zealand. We also include 3 in the Academy from Melbourne, 285 to 316 mm. long.

N
SCIAEMIDAE.

Cynoscion striatus (Cuvier). *Fig. 189.*

Head $2\frac{7}{8}$; depth $3\frac{3}{5}$; D. X, I, 19; A. II, 9, 1; scale rows in lateral line 59 to caudal base, and 8 more on latter;

tubes in lateral line 48 to caudal base; 8 scales above lateral line to spinous dorsal origin, 8 to soft dorsal origin, 9 below to anal origin; 53 predorsal scales; snout $4 \frac{1}{8}$ in head from upper jaw tip; eye 5; maxillary $2 \frac{1}{4}$; interorbital $4 \frac{3}{5}$.

Body elongately fusiform, well compressed; least depth of caudal peduncle $1 \frac{1}{4}$ its length or $3 \frac{4}{5}$ in total head length. Snout conic, long as wide; Eye center at first third in head without mandible. Mouth large, lower jaw well protruded. Maxillary to hind pupil edge; expansion $1 \frac{1}{2}$ in eye. Upper teeth biserial outer row larger, 3 forward canines, of which 2 slender, long and simple; lower teeth uniserial laterally, little smaller and as narrow band in front; no others. Hind nostril 3 times front one, which about last fourth in snout. Interorbitally broadly convex, and slight superciliary ridge each side. Preopercle edge membranous, fringed, also suprascapular.

Rakers 9+16, lanceolate, about twice filaments or $1 \frac{2}{5}$ in eye. Scales weakly ciliate, in longitudinal rows, all inclined slightly forward before anal, then horizontal; soft dorsal, anal and caudal largely covered with small scales; breast and chest with small scales; radiating basal striae 11 to 13; apical centricles 34 to 42; circuli 90 to 135; 12 rows of cheek scales to preopercle ridge, fifth to seventh rows small; lateral line slopes down until midway in depth over anal; tubes with median longitudinal groove and 2 or 3 short branches above and as many below. Pectoral $2 \frac{1}{5}$ in head; ventral $1 \frac{9}{10}$?; other fins damaged.

Color in alcohol dull brownish, with brassy tints, paler below. Each row of scales with pale median streak, darker edges bordering each side so intervening darker ones about equally wide. Fins dull brown. Length 187 mm. Northern Patagonia.

Cynoscion microlepidotus (Cuvier). *Fig. 190.*

Head $2 \frac{4}{5}$; depth $3 \frac{3}{5}$; D. X - I, 21; A. II, 10, 1; scales 120 in lateral line to caudal base and about 18 more larger on latter; tubes about 58 in lateral line to caudal base; 21 scales above lateral line to spinous dorsal origin; 17 below to spinous anal origin; about 70 predorsal scales; snout $4 \frac{1}{8}$ in head from upper jaw tip; eye $4 \frac{7}{8}$; maxillary $2 \frac{1}{8}$; interorbital 4.

Body elongately fusiform, well compressed; least depth of caudal peduncle $1 \frac{2}{5}$ its length or $3 \frac{3}{4}$ in total head length. Head width $2 \frac{2}{5}$ in its length. Snout conic, length $\frac{7}{8}$ its width. Eye elevated, hind edge midway in total head length. Mouth large, lower jaw well protruded. Maxillary to hind pupil edge; expansion $1 \frac{1}{4}$ in eye. Upper teeth biserial, outer row larger, and pair of canines in front inside; lower teeth larger than most of upper, uniserial, mostly uniform; no others. Nostrils close; hind one little larger; front one at last fourth in snout. length. Interorbital broadly convex, with developed superciliary ridge each side. Preopercle and suprascapular with membranous edges.

Rakers 3+6, lanceolate, nearly long as filaments, which about 2 in eye. Scales cycloid, very small, largest on top of head; soft dorsal, anal and caudal largely covered with small scales; radiating basal striae 7 or 8; circuli 38 to 42; about 12 rows of cheek scales; several large scales directly behind eye; lateral line slopes moderately, mostly parallel with dorsal profile, midway along caudal peduncle side out over length of caudal medially; tubes simple. Third dorsal spine $2\frac{1}{2}$?; ventral $2\frac{1}{8}$?. Color in alcohol with back gray-brown, sides and below silvery-whitish. Iris brown. Fins pale brown. Length 171 mm. Rio Janeiro.

We have also examined a dried skin in the Academy from Buenos Aires. It shows: Head $3\frac{1}{6}$; depth $4\frac{1}{2}$; D. IX, I, 20; A. II, 1, 8, 1; scales in 57 rows along and close above lateral line to caudal base, and 7 more on latter; tubes 49 in lateral line to caudal base and 7 more, larger on latter; 8 scales above lateral line to spinous dorsal origin, 8 to soft dorsal origin and 9 below to spinous anal origin; about 47 predorsal scales; snout $4\frac{1}{8}$ in head from upper jaw tip; eye $5\frac{3}{5}$; maxillary $2\frac{2}{5}$; interorbital $5\frac{1}{3}$; fourth dorsal spine $2\frac{2}{5}$; upper caudal lobe $1\frac{3}{5}$; pectoral $1\frac{9}{10}$; ventral $2\frac{1}{5}$. Scales with 22 radiating basal striae; blunt apical denticles 55. In color dull brown, paler to whitish below. Narrow dark lines follow rows of scales on back and down below lateral line till level with pectoral axil, which dusky. Fins dull

brown, dorsals and caudal with traces of pale dusky. Length 471 mm.

This species was originally described from Surinam, and has been subsequently recorded by Steindachner¹⁴⁷ from Maranhao. Compared with C. acoupa from Colon, in the Academy, the latter has much smaller head, more slender body and fewer scales.

¹⁴⁷

Denk. Ak. Wiss. Wien, vol. 41, 1879, p. 39.

Larimus breviceps Cuvier. *Fig 191.*

Head 3; depth $2 \frac{7}{8}$; D. IX, I, 24, 1; A. II, 7, 1; scales 47 along and close above lateral line to caudal base; 46 tubes in lateral line to caudal base; 6 scales above lateral line to spinous dorsal origin; 6 to soft dorsal origin, 8 below to spinous anal origin; about 25 predorsal scales; snout $4 \frac{7}{8}$ in head from upper jaw tip; eye $4 \frac{7}{8}$; maxillary 2; interorbital $3 \frac{3}{4}$.

Body elongately ovoid, deep forward, compressed; caudal peduncle about long as deep, least depth $3 \frac{1}{2}$ in total head length; Head width $2 \frac{1}{8}$ its length. Snout obtuse, convex, length $\frac{3}{5}$ its width. Eye rounded, elevated, center slightly before first third in head. Mouth large, nearly vertical, lower jaw protruded. Maxillary to front pupil edge; expansion about equals eye. Teeth minute, simple, conic, in narrow band in

each jaw. Pores on snout end and chin obsolete. Nostrils together, hind one larger, front one about last fourth in snout. Preopercle and suprascapula with membranous edges.

Rakers $10+20$, lanceolate, $1 \frac{1}{6}$ in eye; filaments $\frac{3}{5}$ of rakers. Scales adherent, rows slightly oblique above. lateral line, horizontal below; scales little smaller on predorsal, more so over most of soft dorsal, anal and caudal; radiating basal striae 10; apical denticles 36 to 43; circuli fine; lateral line parallel with dorsal profile; drops to horizontal just behind anal; tines with several branches at first; become trifid or bifid posteriorly. Second anal spine $2 \frac{3}{5}$ in head; pectoral $1 \frac{1}{4}$; ventral $1 \frac{1}{2}$. Color in alcohol back olive-brown, sides and below paler, with brassy tints; Fins dull brown, with dusky tints. Length 193 mm. (caudal tips damaged). Rio Janeiro.

A smaller example in the Academy from Port-of-Spain, Trinidad, 160 mm. long is more or less bright silvery-whitish generally, dusky axillary spot and fins pale. Its scales show 15 basal radiating striae and 45 apical denticles.

Adontoscia dentex (Cuvier). 7.5.1932.
Drawing by J. H. Richard, of an
example from northern Patagonia.

Odmossion Gill.

Paralarimus Fowler and Bean, Proc.
U. S. Nat. Mus., 63, 1923, p. 18. Type
Paralarimus patagonicus Fowler and
Bean, orthotypic.

Odmossion dentex (Cuvier). ^{Fig. 12}
Paralarimus patagonicus Fowler and
Bean, l.c. northern Patagonia.

The type of Paralarimus patagonicus
does not differ from the West Indian
Covina dentex Cuvier. Drawing by
Richard.

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Stellifer minor (Tschudi). 759. 193.

Head 3 to $3 \frac{1}{5}$; depth $2 \frac{3}{4}$ to $2 \frac{7}{8}$; D. XII, I, 20; A. II, 11, 1; scales in 55 rows above and along lateral line to caudal base and 8 more on latter; tubular scales 49 in lateral line to caudal base; 9 scales above lateral line to spinous dorsal origin; 7 to 9 above to soft dorsal origin and 10 to 11 below to spinous anal origin; 44 to 48 predorsal scales; snout $4 \frac{1}{8}$ to $4 \frac{1}{5}$ in head; eye $4 \frac{3}{4}$ to $5 \frac{1}{8}$; maxillary $2 \frac{2}{5}$ to $2 \frac{2}{3}$; interorbital $2 \frac{7}{8}$ to 3.

Body elongately ovoid, well compressed, back scarcely elevated; least depth of caudal peduncle $1 \frac{1}{8}$ to $1 \frac{2}{5}$ in its length or $3 \frac{1}{8}$ to $3 \frac{1}{2}$ in head. Head $1 \frac{3}{4}$ to 2 in its length. Snout convex; length $\frac{2}{3}$ its width. Eye with hind pupil edge nearly at or very slightly behind first third in head. Mouth moderate; oblique lower jaw slightly shorter. Maxillary reaches first $\frac{3}{5}$ in eye or hind pupil edge; expansion $1 \frac{2}{3}$ to $1 \frac{7}{8}$ in eye. Teeth fine; band in each jaw; outer upper teeth slightly larger. Chin with 6 pores, gradually larger to outermost at each side; slight slit each side at end of snout. Nostrils alike, front one near last $\frac{2}{5}$ in snout, with hind one midway between it and eye. Interorbital broadly convex, with superciliary flange. Preopercle edge with 3 conspicuous spines at angle, and about 5 obsolete ones, sometimes mere short knobs, above on hind edge; lowest spine directed slightly forward and next above downward.

Suprascapula scaly, membranous.

Rakers 13+20, 11, lanceolate, equal filaments or $1 \frac{1}{5}$ in eye. Scales adherent, in parallel rows above lateral line, in horizontal rows below; smaller scales on breast and predorsal, much smaller on soft dorsal, anal and caudal, all of which largely covered; radiating basal striae 8 to 10; apical denticles 27 to 34; circuli fine; lateral line strongly arched, falls until horizontal over anal, then midway along caudal peduncle side to caudal base; tubes bifid at first, then mostly trifid. Fifth dorsal spine $1 \frac{7}{8}$ in head; fourth dorsal spine $1 \frac{4}{5}$; first branched dorsal ray 2 to $2 \frac{1}{8}$; second anal spine $2 \frac{7}{8}$ to 3; pectoral $1 \frac{1}{10}$; ventral $1 \frac{1}{2}$ to $1 \frac{3}{5}$. Color in alcohol dull brownish generally, paler below and on lower sides, also with silvery-white tints. Fins all dull brownish. Dusky shade inside gill-opening above. Length 168 mm? (caudal damaged). One without data, likely from Peru? We also include the example in the Academy from Pecosmayo Bay, recorded by Cope as Corvina agassizi.¹⁴⁸ It is 170 mm. long, and in much better condition than the Wilkes specimen.

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Proc. Amer. Philos. Soc., vol. , 1877, p. 42.

Micropogon opercularis (Quoy and Gaimard). *Fig. 194.*

Head 3; depth $3 \frac{3}{5}$; D. X, I, 30, 1; A. II, 9, 1; rows of scales along and above lateral line 57 to caudal base; 7 scales above lateral line to spinous dorsal origin, 8 to

soft dorsal origin and 8 below to spinous anal origin; predorsal scales about 42; snout $3 \frac{3}{5}$ in head; eye $4 \frac{1}{2}$; maxillary $2 \frac{1}{2}$, interorbital 4.

Body elongately ellipsoid, well compressed; least depth of caudal peduncle about $1 \frac{1}{4}$ its length or $3 \frac{4}{5}$ in head; Head width $2 \frac{1}{4}$ its length. Snout convex, length $\frac{5}{6}$ its width. Eye large, hind pupil edge slightly advanced from head center. Mouth small, low, lower jaw well included. Lips narrow, finely papillose. Maxillary to pupil; expansion $2 \frac{3}{4}$ in eye. Bands of small conic teeth in jaws, outer row little enlarged; lower teeth smaller. Each side of snout in front with short marginal slit at front preorbital edge; chin with 4 pores; inner border of mandibular rami anteriorly each with 4 short even barbels. Hind nostril twice size of front one, which about midway in snout length. Interorbital broadly convex. Preopercle edge denticulate behind, denticles larger below to corner, where 2 largest, sidely separate, upper longer and broad lower directed downward and backward; suprascapula membranous, scaly.

Rakers ~~7~~ 12, III, lanceolate, $1 \frac{1}{4}$ in filaments, which $2 \frac{1}{5}$ in eye. Scales weakly ctenoid, in backward inclined longitudinal rows, smaller on chest, each side of breast, prepectoral, predorsal, narrowly on soft dorsal and anal basally, over most of caudal and bases of paired fins; radiating basal striae 11 or 12; apical denticles 33 to 39; circuli fine; cheek with 12 rows of scales, first 4 or 5 rows enlarged; lateral line

slightly arched at first, then midway along side on caudal peduncle behind anal; tubes bifid, some slightly quadrified. Third dorsal spine $2\frac{1}{4}$ in head; second dorsal ray 3; second anal spine $2\frac{2}{4}$; second anal ray $2\frac{1}{3}$; pectoral $1\frac{2}{5}$; ventral $1\frac{4}{5}$. Color in alcohol dusky-gray on back, sides and below paler, all with deep silvered sheen. Traces of dark lines, follow obliquely, rows of scales, each line medially along row. Fins and iris brown. Length 145 mm. (caudal damaged). One example with out data, likely from northern Patagonia?

A dried skin in the Academy, from Buenos Aires, shows: Head $3\frac{1}{2}$; depth 4; D. X, I, 1, 26, 1; A. II, 8, 1; rows of scales along and close above lateral line 58 to caudal base, and about 6 larger on latter; tubes in lateral line 50 to caudal base and 7 large on latter; 7 scales above lateral line to spinous dorsal origin, also 7 to soft and dorsal origin, and 9 below to spinous anal origin; about 33? predorsal scales; snout $3\frac{1}{4}$ in head; eye 7; maxillary $2\frac{7}{8}$; interorbital $3\frac{1}{2}$. Teeth more subequal in size, outer upper very little larger. Two large preopercle denticles at corner directed downward, others above but slightly developed. Scales with 12 basal striae largely median and not reaching edge; denticles 38 apically. Third dorsal spine $2\frac{1}{4}$ in head; first branched anal ray $3\frac{1}{2}$; second anal spine $5\frac{1}{6}$; second anal ray $2\frac{1}{3}$; pectoral $1\frac{2}{5}$; ventral $1\frac{7}{8}$. Dry skin pale brown generally,

very light below. Back with narrow, well defined deep brown lines; one to each row of scales, usually little less than $1/3$ its exposure width, slightly waved and some of lower ones little broken or irregular. Slight dusky shade in axilla. Fins brown, with dusky shade at end of spinous dorsal. Length 516 mm.

Compared with M. undulatus from Maryland, the latter differs in the dark lines far less regular, more zig-zag, specked and not following evenly within the inclined scale rows. Its soft dorsal is rather finely spotted, while the Patagonian species shows a narrow dark or dusky streak in each membrane parallel and between the rays. M. undulatus has more barbels, or usually 5 pairs and Chesapeake Bay examples do not show any difference in scale structure, or basal striae 10 and apical denticles 38, in specimens 223 mm. long.

Starks compared Para examples with Jamaican examples of M. furnieri¹⁴⁹ and found the Brazilian fish with a sharper snout projecting further over the mouth, head less deep and more depressed above eyes, and the other characters agreeing with our material. A comparison with M. opercularis listed by Fowler from Rio Janeiro¹⁵⁰ and M. furnieri he lists from Santo Domingo¹⁵¹, shows the latter a distinct species, embracing the characters alleged by Starks, except we do not detect

149 Stanford Univ. Pubs., 1913, p. 54.

150 Proc. Acad. Nat. Sci. Phila., 1919, p. 129.

151 Copeia, no. 24, Nov. 19, 1915, p. 50.

a sharper and more projecting snout, also the head does not appear less deep (on the contrary the example of M. opercularis has a much deeper head) and soft dorsal rays 27. M. furnieri being thus very closely related, our Santo Domingo example shows: Head $3 \frac{1}{3}$; depth $3 \frac{1}{2}$; D. X, I, 28, 1; A. II, 8, 1; scales along and above lateral line 81 to caudal base; 8 scales above lateral line to spinous dorsal origin, 8 also above to soft dorsal origin and 9 below to spinous anal origin; 44 predorsal scales; snout $3 \frac{2}{5}$ in head; eye $4 \frac{1}{2}$; maxillary $2 \frac{4}{5}$; interorbital $3 \frac{3}{4}$. Maxillary to eye center. Rakers 9 + 12, 11, lanceolate, $1 \frac{1}{6}$ in filaments, which 2 in eye. Scales strongly ctenoid; basal radiating striae 7 to 10; apical denticles 30 to 34; circuli moderate. Third dorsal spine strongly curved, $1 \frac{3}{5}$ in head. Length 174 mm.

The Rio Janeiro example of M. opercularis is about 180 mm. long, and is therefore conformable in size. Its coloration agrees with the large, dried skin from Buenos Aires in the details set forth above. M. furnieri is described with short, dark, vertically inclined bars extending across the lateral line and with many oblique lines still above them.

Johnius fasciatus (Tschudi) 7-24-115
~~Head $2 \frac{4}{5}$ to 3; depth $2 \frac{1}{3}$ to $2 \frac{3}{4}$; D. X, I, 24, 1 to 26,~~
 1; A. II, 8, 1; scales 78 to 80 along and above lateral line to caudal base, with 10 to 12 more larger ones on latter; tubular scales 50 or 51 in lateral line to spinous dorsal origin, 10 above to soft dorsal origin; 48 to 57 predorsal scales; snout

$3 \frac{2}{3}$ to $3 \frac{7}{8}$ in head; eye 6 to $6 \frac{1}{5}$; maxillary 3; inter-orbital $3 \frac{1}{5}$ to $3 \frac{1}{2}$.

Body rather ovoid, compressed, with elevated convex back; caudal peduncle long as deep or least depth 3 to $3 \frac{2}{5}$ in head. Head width $1 \frac{7}{8}$ to $1 \frac{9}{10}$ its length. Snout broadly convex, length $1 \frac{1}{8}$ to $1 \frac{1}{6}$ its width. Eye rounded, hind pupil edge at first third in head. Mouth small, lower jaw included. Maxillary to eye center; expansion $1 \frac{5}{6}$ to 2 in eye. Broad bands of simple conic crowded teeth in jaws, outer upper row little larger, curved and slightly compressed. Lips broad, largely papillose. Snout tip with 6 pores in 2 rows and slit at end of each row each side in front; chin with 6 deep pores, last longest. Nostrils large, close before eye, in last half of snout and hind one not quite twice front one. Interorbital strongly convex. Preopercle edge membranous; opercle with broad membranous flap above; suprascapula entire, scaled.

Rakers $v + ix$, rudimentary low broad asperous tubercles; filaments equal eyes. Scales ctenoid, in oblique rows, smaller along body edges, become minute on breast; fins more or less covered with minute scales, at least basally, except spinous dorsal and inner surfaces of paired fins; basal striae 5 to 7; apical denticles 36 to 44; circuli fine; cheek scales scarcely ctenoid, about 10 rows to preopercle angle, of which second, third anal and last rows enlarged; 6 rows on preopercle flange,

with first 4 rows enlarged; lateral line concurrent with dorsal profile, slightly elevated along caudal base; tubes mostly trifid. Third dorsal spine $2\frac{1}{4}$ in head; second dorsal ray $2\frac{7}{8}$; second anal spine 3 to $3\frac{1}{3}$; upper caudal lobe $1\frac{2}{5}$ to $1\frac{1}{2}$?; pectoral $1\frac{1}{2}$ to $1\frac{3}{5}$; ventral $1\frac{3}{5}$ to $1\frac{2}{3}$. In alcohol deep umber, pale only on under surface of head, breast and abdomen ventrally, where all with soiled or smutty appearance. Broad deep brown to dusky blotch on opercle little larger than eye. Pectoral pale, other fins all more or less dark brownish. Pale streak little less than eye width, from last dorsal spine to vent. Length 245 to 250 mm. One from Peru and another without locality also likely from Peru?

We have also examined a dried skin from Valparaiso, in the Commercial Museum of Philadelphia. It shows: Head $3\frac{3}{4}$; depth $3\frac{1}{2}$; D. IX, I, 21; A. II, 8; scales 55 in lateral line to caudal base, and about 20 more on latter; 9 scales above lateral line to spinous dorsal origin, 10 below to spinous anal origin; snout $3\frac{2}{3}$ in head; eye 8; maxillary $2\frac{3}{5}$; interorbital $3\frac{3}{4}$; chin with 4 pores, 2 each side; maxillary to eye; preopercle serrate; length 698 mm.

Evermann and Radcliffe admit 5 Peruvian species in Johnius,¹⁵² grouped primarily on the count of transverse rows of scales above the lateral line. For J. fasciatus

¹⁵² Bull. U.S. Nat. Mus., No. 95, 1917, p. 101.

they give 50 to 55, but our examples are certainly the Cheilotrema fasciatum of Tschudi and have 78 to 80 rows of scales above the lateral line likely Sciaena starksi Evermann and Radcliffe is synonymous with S. wieneri Sauvage, as the outstanding character in the disparity of 68 and 85 scales respectively may be due to a different method of counting?

Johnius deliciosus (Tschudi). 724. 196.

Head 3 to $3 \frac{1}{8}$; depth $3 \frac{1}{6}$ to $3 \frac{1}{3}$; D. X, I, 23 or 24; A. II, 10, 1; 55 to 61 rows of scales along and close above lateral line to caudal base and 7 more larger ones on latter; 49 to 50 tubular scales in lateral line to caudal base; 7 or 8 scales above lateral line to spinous dorsal origin; 7 or 8 to soft dorsal origin, 11 or 12 below to spinous anal origin; 48 to 52 predorsal scales; snout $3 \frac{3}{4}$ to 4 in head; eye $5 \frac{1}{3}$ to $5 \frac{4}{5}$; maxillary $2 \frac{2}{5}$ to $2 \frac{4}{5}$; inter-orbital $3 \frac{2}{3}$ to $3 \frac{4}{5}$.

Body elongate, rather fusiform, compressed; least depth of caudal peduncle $1 \frac{1}{8}$ to $1 \frac{1}{6}$ in its length or $3 \frac{2}{3}$ or $3 \frac{4}{5}$ in head. Head width $2 \frac{1}{8}$ to $2 \frac{1}{4}$ in its length. Snout convex, length $\frac{7}{8}$ its width. Eye but slightly elevated, hind pupil edge about first third in head. Mouth small, low, lower jaw much shorter. Maxillary to hind pupil edge, to eye center

in smaller example; expansion $1 \frac{2}{3}$ to $2 \frac{1}{5}$ in eye. Teeth conic, in bands in jaws, upper outer row slightly enlarged. Lips coriaceous, finely papillose, also chin. Pair of small pores near snout tip, with slight marginal slit each side; chin with short thick rounded fleshy tubercle and 2 pores each side, outer larger. Nostrils rather large, front one about midway in snout length, hind one twice as large, little nearer front one than eye. Interorbital well convex, with slight superciliary ridge; preorbital about long as snout, width about half its length; preopercle edge firm, uneven or roughened, few denticles weak or rudimentary; suprascapula similar, scaly.

Rakers 7-10, iii, lanceolate, short, half of filaments which equal pupil. Scales finely ctenoid; basal radiating striae 9 or 10; apical denticles 35 to 47; circuli fine; scales in longitudinal rows slightly inclined or waved upwards and backwards, appear as if crossing lateral line; largest scales along side medially, smaller on breast, predorsal, along dorsal, anal, pectoral and ventral bases and out over most of caudal; 12 rows of scales on cheek, fifth to seventh rows small; lateral line slopes concurrently with dorsal profile until over middle of anal, then horizontal and midway along caudal peduncle side; slender tubes broadly bifid. Fourth dorsal spine $2 \frac{1}{5}$ to $2 \frac{1}{4}$ in head; third dorsal ray $2 \frac{2}{3}$; second anal spine $3 \frac{1}{4}$ to $3 \frac{1}{3}$; second anal ray $2 \frac{1}{2}$ to $2 \frac{2}{3}$; pectoral $1 \frac{1}{4}$ to $1 \frac{3}{5}$; ventral $1 \frac{1}{2}$ to $1 \frac{7}{8}$.

Johnius fasciatus

~~Tschudi~~

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Color in alcohol dull brownish, with pale gray tinge generally and paler to brownish-white on under surface. Fins dull uniform brown. Iris pale brown. Pectoral axil dusky. Slightly darker streak than ground-color follows each row of scales medially in its course in smaller examples, and as scales smaller much narrower above lateral line. Length 188 to 243 mm. One from Peru, and two without data likely from the same country?

Sciaena Linnaeus.
Subgenus Sciaena Linnaeus

Sciaena coroides (Cuvier) Fry - 197.

Head $3 \frac{2}{3}$; depth $3 \frac{1}{4}$; D. X, I, 27, 1; A. II, 6, 1; scale rows 55 along and close above lateral line to caudal base; 50 tubular scales in lateral line to caudal base; 7 scales above lateral line to soft dorsal origin, 10 below to spinous anal origin; 40 predorsal scales; snout $3 \frac{1}{5}$ in head; eye $4 \frac{1}{4}$; maxillary $2 \frac{1}{3}$; interorbital $3 \frac{1}{5}$. Rakers 5 9 short points. Scales finely ctenoid, basal radiating striae 8, apical denticles 54 to 64 and circuli very fine. Length 185 mm. Rio Janeiro. It agrees with 2 examples in the Academy from St. Marten's, West Indies.

Subgenus Ctenosciaena Fowler and Bean.

Ctenosciaena Fowler and Bean, Proc. U.
S. Nat. Mus., 63, 1923, p. 15. Type
Sciaena dubia Fowler and Bean,
orthotypic.

Sciaena dubia Fowler and Bean.
Sciaena dubia Fowler and Bean, l.c.,
p. 16, no locality.

Menticirrhus americanus (Linnaeus). Fig. 198.

Drawing of an example from Rio
Janeiro, by J. H. Richard.

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Cirrime^mns ophiocephalus (Jenyns). *Fag. 199.*

Head $3\frac{1}{2}$; depth $4\frac{1}{3}$? D. XII, I, 22; A. I, 10; scales in 91 rows above and along lateral line to caudal base; about 60 tunular scales in lateral line to caudal base; 11 scales above lateral line to spinous dorsal origin; 9 to soft dorsal origin, 16 below to spinous anal origin; 58 predorsal scales; snout $3\frac{3}{5}$ in head; eye 7; maxillary $3\frac{1}{6}$; interorbital $2\frac{2}{5}$.

Body elongate, slender, well compressed; caudal peduncle well compressed, least depth $1\frac{1}{3}$ its length. Head rather robust, width $1\frac{1}{4}$ its length. Snout obtuse, convex, length $\frac{3}{4}$ its width. Eye small, hind pupil edge about first third in head. Mouth small, inferior, lower jaw much shorter than upper. Maxillary with end free, reaches about middle of eye; expansion $1\frac{1}{4}$ in eye. Teeth fine, conic, slender, little curved, in bands in jaws; upper teeth gradually larger externally; lower teeth more uniformly even, erect, small, fewer; no others. Snout front with 5 pores, upper 2 small ones simple, lower 3 larger and with fringed edges; chin with 3 close-set pores in a row and median short truncate barbel about $\frac{2}{5}$ of eye. Nostrils rather large, hind one nearly 3 times size of front, which about midway in snout length. Interorbital broadly convex, with slight depression medially and each side. Occiput forms slight median keel to interorbital; preopercle edge membranous, with weak denticles; suprascapula membranous, scaly.

Rakers $ii+v$ short low tubercles, finely spinescent; filaments $1+1\frac{1}{4}$ eye-diameters. Scales mostly adherent, in rows slightly inclined forward, crossing lateral line; basal marginal striae 16 to 19; apical denticles 34 to 46; circuli moderately fine; cheek with 12 rows of scales, first and second, and ninth to tenth rows, enlarged; small scales over bases of most fins except spinous dorsal and both anals; scales smaller along body edges, and moderately small on breast and chest; lateral line slopes gradually from shoulder, parallel with dorsal profile, slightly elevated at first along caudal peduncle side until finally median at caudal base; trifid tubes fine. Third dorsal spine $1\frac{3}{5}$ in head; fourth dorsal ray; anal spine 5; second anal ray $1\frac{7}{8}$; upper caudal lobe $1\frac{1}{5}$; hind fin edge slightly sigmoid; pectoral $1\frac{1}{3}$; ventral $1\frac{7}{8}$. Un alcohol dull umber-brown, paler below with silvery-white tints. Fins all brownish. Length 207 mm. One without locality, though doubtless obtained at Valparaíso or somewhere in Chili?

Eques acuminatus (Schneider). *Fig. 200.*

Head 3; depth $2\frac{3}{4}$; D. X - I, 37, 1; A. II, 7; scales about 70 along and close above lateral line to caudal base, rows about 661 tubular scales 51 in lateral line to caudal base; 7 scales above lateral line to spinous dorsal origin, 10 below to spinous anal origin; 34 predorsal scales; snout $3\frac{1}{4}$ in head; eye $4\frac{3}{5}$; maxillary $2\frac{4}{5}$; interorbital $4\frac{1}{5}$.

Body elongate, irregularly ovate, back elevated forwards; length of caudal peduncle about $4/5$ its least depth which 4 in head. Head width half its length. Snout well convex, long as wide. Eye little elevated, center about first third in head length. Mouth small, low, lower jaw inferior. Maxillary with upper edge concealed its whole length, reaches pupil; expansion 2 in eye. Teeth fine, simple, pointed, in bands in jaws, few front outer lower ones slightly enlarged and entire outer upper row enlarged, especially anteriorly. Snout tip with 2 rows of pores, 3 in each row; pore-like slit externally each side, which not continuous with lip; mandible end or chin with large pore-like slits, one median and 2 each side, of which last largest. Front nostril about last 2.5 in snout; hind one over twice as large, midway between front one and eye. Interorbital broadly convex, without superciliary ridge. Preopercle edge membranous; supra-scapula similar, firmer.

Rakers ~~5~~ 10, 1, lanceolate, $1\frac{1}{2}$ in filaments, which 2 in eye. Scales finely ctenoid; basal marginal striae 8 to 10; apical denticles 53 to 70; body scales in oblique rows crossing; very small scales crowded over all fins; cheek with 7 rows of scales, with first to third and fifth rows enlarged; lateral line concurrent with dorsal profile until behind depressed anal, then horizontal along caudal peduncle side and out over caudal. Third dorsal spine $1\frac{5}{6}$ in head; third dorsal ray $3\frac{1}{2}$; second anal spine $2\frac{7}{8}$; second anal ray 2; caudal truncate, $1\frac{2}{3}$; pectoral

$1\frac{1}{2}$; ventral $1\frac{1}{2}$. In alcohol dusky-brown generally. Four obscure pale lines, about $\frac{1}{3}$ of pupil in width, horizontally on sides; uppermost from suprascapula; second from upper angle of gill-opening; third from upper eye edge, crosses lateral line, joins second little before depressed anal tip then continued along upper caudal peduncle edge to caudal base; fourth from pectoral axil. Fins deep brown. Length 178 mm. One without locality, doubtless from Rio Janeiro?

SILLAGINIDAE.

Sillago sihama (Forskål).

Head $3\frac{1}{5}$ to $3\frac{1}{3}$; depth 5 to $5\frac{2}{3}$; D. XI - 1, 20 or 21; A. III, 20 or 21; 71 to 73 rows of scales in lateral line to caudal base; 6 scales above lateral line to soft dorsal origin, 10 below to spinous anal origin; 23 to 28 predorsal scales to occiput; snout $2\frac{1}{5}$ to $2\frac{2}{3}$ in head; eye $3\frac{3}{5}$ to $6\frac{1}{5}$; maxillary $4\frac{4}{5}$ to $5\frac{2}{5}$; interorbital $4\frac{3}{4}$ to $4\frac{4}{5}$; head width 2 to $2\frac{3}{5}$. Snout conic, width $1\frac{1}{2}$ its length. Interorbital level. Rakers 3 + 6, lanceolate; $2\frac{1}{8}$ in filaments, which $1\frac{2}{3}$ in eye. Scales with 20 to 10 basal radiating striae, apical denticles 43 to 65; circuli moderate. Color in alcohol dull brown, lower half of head and trunk and under surface paler to whitish. Fins dull brown. Iris brassy. In medium sized example soft dorsal over greater basal portion with several brownish spots on each ray. Length 62 to 238 mm. One from Colombo; one from Manila and 2 from Singapore.

The adult Colombo example differs from the others, doubtless due to age, in the tubes in lateral line more or less obscured by the small auxillary scales, which also more or less prevalent over trunk. In the others the tubes are all clean cut and few, if any, auxillary scales occur.

Sillago ciliata Cuvier.

Head $3 \frac{1}{6}$ to $3 \frac{1}{4}$; depth $4 \frac{2}{5}$ to $4 \frac{2}{3}$; D.XI - 1, 17 or 18; A. III, 14 or 15; lateral line with 61 to 65 scales to caudal base; 6 scales above lateral line to soft dorsal origin, 10 below to soft anal origin; 30 to 32 predorsal scales; snout 2 to $2 \frac{1}{4}$ in head; eye 5; maxillary $4 \frac{2}{5}$ to $4 \frac{4}{5}$; interorbital 5 to $5 \frac{2}{3}$; head width $2 \frac{1}{5}$ to $2 \frac{1}{4}$. Snout conic, width $1 \frac{2}{3}$ its length. Rakers 3+8, thick lanceolate points, $1 \frac{1}{2}$ in filaments, which $2 \frac{1}{3}$ in eye. Scales with 8 to 10 radiating basal striae; apical denticles 50 to 56; circuli fine. Caudal well emarginate behind. Color in alcohol dull brownish generally. Along side medially broad pale brassy band, about wide as eye and narrowed on side of caudal peduncle. Spinous dorsal with 5 or 6 rows of dusky spots on membranes, also same, though smaller, on rayed fin membranes. Length 198 to 205 mm. One from Sydney, and another from Singapore.

Branchiostegidae.

LATILIDAE.

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Pseudopercis numida Miranda Ribeiro.

Fig. 406.

Head $3 \frac{1}{4}$; depth $4 \frac{2}{5}$; D.V, 27; A. 23; scales 75 in lateral line to caudal base; about 70 tubes in lateral line to caudal base and 12 more on latter; 9 scales above lateral line to soft dorsal origin, 23 below to anal origin; snout $3 \frac{1}{5}$ in head from upper jaw tip; eye 5; maxillary 3; interorbital 5.

Head width $1 \frac{9}{10}$ in its total length. Snout conic; long as wide. Maxillary to eye. Bands of simple conic teeth in jaw; outer row little enlarged and each tooth slightly curved; no teeth on mouth roof. Interorbital slightly convex. Preopercle edge denticulate, and denticles covered with skin. Rakers II, 3+6, II, short, fleshy points, 4 in filaments and latter equal eye. Scales with 15 to 22 basal radiating striae; 30 to 42 apical denticles; basal circuli fine; marginal coarse; small scales on top of head around suborbital region, opercles and cheeks; other scales on head moderate. Edge of

snout, lips, maxillary and mandible naked or skin coriaceous. Color in alcohol uniform umber, little paler to slightly ochraceous below. Fins all dull brownish, dorsals little darker marginally and ventrals with innermost ray pale like belly. Length 300 mm. One without locality, doubtless from Rio Janeiro?

Our example agrees in so many respects with Ribeiro's account and figure that we believe it to be the same species. In the generic diagnosis Ribeiro says "vomer provido de dentes curtos, obtusus, os palatinos d'una fila d'outros memores". Although the upper buccal fold is quite broad we cannot find any structures which may be considered as teeth or even denticles. The vomer is covered with thick, small, close-set papillae and few scattered papillae are found over the palatine region and elsewhere on the roof of the mouth. Other features, not in agreement, as given by Ribeiro, are : D. VII, 28; A.27; lateral line with 88 scales; 10 scales above lateral line. His figure does show, however, rather conspicuous upper front canines and preorbital apparently naked, while in our example the preorbital and snout are closely scaled. P. somnambula Berg we have not consulted.

Pinguipes brasiliianus Cuvier.

Fig. 407.

Head $3 \frac{3}{4}$; depth $4 \frac{1}{6}$; D.VII, 26; A.25; scales in 100 rows along lateral line to caudal base; 75 scales in lateral line to caudal base; 17 scales above lateral line to soft dorsal origin; 26 scales below lateral line to anal origin; 50 predorsal scales; snout $2 \frac{2}{5}$ in head; eye 5; maxillary $2 \frac{2}{3}$; interorbital 5; head width $1 \frac{3}{5}$. Snout conic, width $1 \frac{1}{6}$ its length. Broad lips tough, finely papillose. Jaws with outer rows of more or less uniform conic teeth, inside band of small simple teeth, wide in front of jaws and narrowing behind; 6 low broad conic teeth in vomer. Interorbital nearly level, with very slight median depression. Preopercle edge entire. Rakers 7+8, lanceolate, $2 \frac{2}{5}$ in filaments, which $1 \frac{1}{2}$ in eye. Scales crowded on predorsal; snout, preorbital and front half of interorbital naked; 14 rows of scales across cheek to $\frac{1}{2}$ preopercle angle; basal radiating striae on scales 10 to 12; apical denticles 26 to 32; lateral circuli coarse, basal fine. Color in alcohol dull brown, belly scarcely paler. Soft dorsal with submarginal dusky band longitudinally. Length 234 mm. Rio Janeiro. Two drawings

by Richard, both without locality.
Branchiostegus
~~latus~~ jugularis (Valenciennes) Fig. 408.

Head $2 \frac{5}{6}$ to 3; depth $4 \frac{1}{4}$ to $4 \frac{3}{5}$; D. IV, 21; A. I, or II, 20 or 21; scales 70 to 74 in lateral line to caudal base; 10 to 12 scales above lateral line to soft dorsal origin, 19 to 22 below to anal origin; 44 to 54 predorsal scales; snout $3 \frac{1}{2}$ to $3 \frac{3}{4}$ in

head from upper jaw tip; eye $3 \frac{2}{3}$ to 4; maxillary $3 \frac{1}{5}$ to $3 \frac{1}{3}$; interorbital $4 \frac{3}{4}$ to $5 \frac{2}{5}$; head width 2 to $2 \frac{2}{5}$ in its total length. Snout broad as long, conic. Eye close to upper profile, 1 to $1 \frac{1}{8}$ in snout. Maxillary not to pupil, or very slightly beyond front rim; expansion narrow, or about $3 \frac{1}{2}$ to $3 \frac{3}{4}$ in eye. Jaws nearly even, lower slightly protruding or little shorter than upper. Bands of conic teeth in upper jaw, outer row little enlarged, especially anterior; lower teeth uniserial laterally and fewer forward than above; no teeth on mouth roof. Interorbital little convex. Preopercle edge with few numerous serrae behind. Rakers $5+9$, conic, robust, short, $2 \frac{3}{4}$ in filaments, which $1 \frac{1}{3}$ in eye. Scales with 6 to 8 strong radiating striae, edges strongly scalloped; apical denticles 17 to 25; circuli coarse above and below, fine basally; 20 scales from lower hind eye edge to preopercle angle. Color in alcohol dull uniform brownish on back and upper surface, paler below. Fins all brown. First membrane of spinous dorsal blackish. Length 115 to 168 mm. One

from Valparaíso and 2 from Peru. *Two drawings by Richard, 1 without locality and the other marked Peru.*

MALACANTHIDAE.Malacanthus hoedtii Bleeker. *Fig. 101.*

Head $4 \frac{3}{5}$; depth $7 \frac{3}{4}$; D. 60; A, 51; scales about 155 in lateral line to caudal base and 12 more on latter; 8 scales above lateral line and 28 below to anal origin; 20 predorsal scales; snout 3 in head; eye $4 \frac{4}{5}$; maxillary $2 \frac{2}{3}$; interorbital $3 \frac{2}{5}$; head width $2 \frac{1}{8}$. Snout conic, long as wide. Eye with hind edge midway in head length; $1 \frac{2}{3}$ in snout. Mouth moderate, lower jaw slightly shorter. Maxillary reaches pupil; expansion 2 in eye. Teeth conic, in bands in jaw, outer row enlarged; no vomerine-palatine teeth. Interorbital broadly convex. Opercle with strong spine. Rakers 1, 5+7 iii, lanceolate, 3 in filaments, which $1 \frac{3}{5}$ in eye. Scales with 8 to 10 basal radiating striae; apical denticles 20 to 27; circuli moderate; 8 scales on cheek below eye to preopercle angle; each tube in lateral line with short prong. Color in alcohol uniform dull brown above, paler below. Caudal with 2 blackish longitudinal bands, sloping toward front fin edges. About 20 faint vertical brownish cross-bars. Length 280 mm. Maui.

M. parvipinnis Vaillant and Sauvage has been credited as a distinct species by some writers. Evidently the slightly increased fin-rays were the supposed chief characters of distinction, though Gunther is doubtless correct in assigning the range of M. hoedtii over the Indo-Pacific¹⁵⁵

Cheilodactylus macropterus (Schneider). 729.202.

Head $3\frac{1}{2}$; depth $2\frac{2}{3}$; D. XVII, 27, 1; A. III, 15; P. ii, 7+vi; scales 57 in lateral line to caudal base; 7 scales above lateral line to spinous dorsal origin; 40 predorsal scales, of which about 10 to occiput; snout $2\frac{3}{5}$ in head; eye $3\frac{2}{3}$; maxillary $3\frac{2}{5}$; interorbital 4.

Body well compressed, back elevated forward; predorsal and preventral with median trenchant ridge; caudal peduncle long as deep, least depth $3\frac{9}{10}$ in head. Head width $2\frac{1}{10}$ its length. Snout conic, compressed, width $1\frac{1}{6}$ its length. Eye large, midway in head length. Mouth moderate, jaws about even. Lips moderately thick, finely papillose. Maxillary to front nostril; expansion 4 in eye. Band of small simple depressible teeth above; irregular row of few larger teeth below, mostly forward; no vomerine or palatine teeth. Nostrils well separated, front one larger, with flap behind, about last fourth in snout. Interorbital convex. Preorbital width $\frac{7}{8}$ of eye. Rakers 1+15 lanceolate, about $\frac{3}{5}$ of filaments, latter 2 in eye. Scales largest on costal region, small along body edges; head covered

with small scales, 12 rows on cheek to preopercle ridge; scales with 6 to 16 basal radiating striae; apical denticles about 23; circuli moderate; lateral line complete, with simple slender tubes, each side small and but little exposed; caudal largely scaly. Sixth dorsal spine $1\frac{3}{4}$ in head; second anal spine 3; uppermost of median simple pectoral rays (broken) at least reaches anal; ventral inserted opposite sixth dorsal spine base. Color in alcohol faded dull olive-brown, paler below. Length 240 mm. Cloudy Bay, New Zealand.

Cheilodactylus variegatus Valenciennes. *Figs.*

Head $2 \frac{7}{8}$ to $2 \frac{9}{10}$; depth $2 \frac{3}{5}$ to $2 \frac{7}{8}$; D. XVII, 29; A. III, 9, 1 or 10; P. ii, $6 + vii$ or $8 + vi$; scales 54 to 56 in lateral line to caudal base and 8 to 10 more on latter; tubes about 54 in lateral line to caudal base and 1 more on latter; 7 scales above lateral line to spinous dorsal origin, 6 or 7 to soft dorsal origin, 15 below to spinous anal origin; 30 to 32 predorsal scales; snout 3 in head; eye 5; maxillary $3 \frac{3}{5}$ to $3 \frac{2}{3}$; interorbital 4.

Body elongately ovoid, compressed, deepest forward, back elevated; caudal peduncle about long as deep, least depth $3 \frac{1}{2}$ to $3 \frac{3}{5}$ in head. Head width $2 \frac{1}{10}$ to $2 \frac{1}{8}$ its length; Snout conic, width 1 to $1 \frac{1}{5}$ in its length. Eye elevated, hind edge midway in head. Mouth small, lower jaw included. Maxillary to nostrils; expansion $2 \frac{1}{2}$ in eye. Lips thick, wide, tough, finely papillate. Bands of fine conic teeth in jaws, narrowing behind; no others. Nostrils large, front one at last, fifth in snout, twice length of hind one, edge entire. Interorbital broadly convex or depressed. Preopercle and suprascapula entire.

Rakers 7 or $8 + 15$, lanceolate, $2 \frac{1}{3}$ to 3 in filaments, which 1 to $1 \frac{1}{8}$ in eye; pseudobranchiae large as gill-filaments. Scales firmly adherent, cycloid, exposures of each finely fugose; rows longitudinally parallel with lateral line; small scales in head, except naked muzzle; breast with very small scales, these extending medianly over chest to ventral origin, though scales otherwise in breast little larger than

largest head scales; small scales along bases of dorsals and anals; caudal entirely scaly; pectoral base scaled; basal marginal striae 15 to 21; circuli fine, rather uneven, mostly basal; lateral line oblique from shoulder to caudal base, high along caudal peduncle and median at caudal base; small tubes, small, slender, simple, oblique on scale. Seventh dorsal spine $3 \frac{1}{5}$ to $3 \frac{3}{5}$ in head; second dorsal ray about 2, second anal spine $5 \frac{1}{2}$; third anal ray 2; pectoral $1 \frac{2}{5}$; ventral $1 \frac{4}{5}$ to $1 \frac{5}{6}$. Color in alcohol dark brown generally, with more or less dark umber tint, only slightly paler on breast and belly. Fins dark brown, uniform. Iris brown. Length 220 to 248 mm. (caudal tips damaged). One from Callao and 2 labeled from Peru.

The above example agrees with the account by Steindachner, in material from Cavancha Bay at Iquique. Cheilodactylus antonii Valenciennes¹⁵⁶ is placed in the synonymy by Steindachner. According to ~~Guichenot~~ the second anal spine is about $\frac{2}{5}$ of the long third one. C. cinctus Tschudi¹⁵⁷ is shown with the second anal spine nearly three times as long as the second, and this is also mentioned in the description.

¹⁵⁶

Zool. Jahrb. Suppl., vol. 4 (2), 1897, p. 291, Pl. 17.

¹⁵⁷

Fauna Peru. Ich., 1844, p. 15, Pl. 2.

We separate the aberrant Chilodactylus bicornis Steindachner, as a separate subgenus.

Güngungo new subgenus

Type Chilodactylus bicornis Steindachner. This group differs from ^{the subgenus} Cheilodactylus in the presence of a supraorbital knob, entirely different physiognomy, enlarged anal spine, naked cheek and truncate caudal. The single species is from Fernandey.

Cirrhitus marmoratus (Lacépède). *Fig.*

Head $2\frac{2}{5}$ to $2\frac{1}{3}$; depth $2\frac{1}{2}$ to $2\frac{3}{4}$; D. X, 11, 1; A. III, 6, 1; scales 38 to 42 in lateral line to caudal base; 4 or 5 scales above lateral line to spinous dorsal origin; 5 or 6 to soft dorsal origin, 9 or 10 below to spinous anal origin; 7 predorsal scales to occiput; snout $2\frac{7}{8}$ to $3\frac{1}{8}$ in head; eye $4\frac{2}{5}$ to 6; maxillary $2\frac{1}{5}$ to $2\frac{2}{5}$; interorbital $5\frac{7}{8}$ to $6\frac{1}{5}$.

Body elongate ovate, back but slightly elevated; caudal peduncle length $\frac{7}{8}$ to 1 in least depth, which $2\frac{7}{8}$ to 3 in head. Head width $1\frac{2}{3}$ to $1\frac{7}{8}$ in its length. Snout about long as wide, profile and surface little convex. Hind eye edge slightly advanced in head length, midway to slightly posterior in young. Mouth large, strong jaws even. Maxillary to eye center; expansion $1\frac{1}{2}$ to $1\frac{2}{3}$ in eye. Teeth strong, simple, conic in outer row, lower with several enlarged each side; each jaw with inner band of villiform teeth, and patch of some on vomer, but none on palatines or tongue; lower inner jaw teeth in villiform band only

anterior, not extending on sides of jaw; teeth all less developed in young. Front nostril about last fourth in snout, little larger than hind one and with flap superiorly behind edge of which with fine cutaneous fringe. Interorbital concave. Hind preopercle edge finely serrate; suprascapula entire.

Rakers v $2+6$, iv or v , short, broad, truncate, barely half of filaments, which $1 \frac{3}{5}$ in eye. Scales cycloid, strongly adherent, in longitudinal rows parallel with lateral line; small scales around opercle edges and on bases of soft vertical fins; about 20 to 25 rows of scales on cheek; basal radiating striae 8; circuli very fine; lateral line slopes obliquely from shoulder to caudal base where median; tubes mostly simple, slender, oblique. Dorsal spines strong, fourth $2\frac{1}{2}$ to $2 \frac{4}{5}$ in head; first dorsal ray 2 to $2 \frac{1}{10}$; second anal spine $2 \frac{2}{5}$ to $3 \frac{1}{6}$; second anal ray $1\frac{3}{4}$ to $1 \frac{7}{8}$; caudal little convex behind, $1\frac{1}{2}$ to $1\frac{3}{4}$; pectoral $1\frac{1}{4}$ to $1 \frac{2}{5}$, rays 1, $6+vii$; ventral fin $1 \frac{2}{5}$ to $1 \frac{4}{5}$.

Color in alcohol faded dull brown, some nearly uniform, others of small size with row of 4 or 5 large pale blotches along base of dorsal fin, and 2 or 3 rows of similar ones below lateral line. Darker intervening color often with dusky blotches, also darker ones on head and about pectoral base. Dark blotches also reflected about bases of rayed vertical fins, and spinous dorsal membranes with dusky blotch,

usually 2 or 3 on each. Length 114 to 253 mm. Two from Oahu, one from Mani and one without data, likely Hawaiian?

We also include a series of 11 examples in the Academy, from Honolulu. *Four drawings by Richard, one labeled Mani, two from Oahu and one from Pomotou.*

In most of the Honolulu examples the pale spots noted above appear as 2 sets of pale blotches on the trunk, of which last 2 form pale rings around caudal peduncle, and the others more or less broken with 2 or more darker blotches. In some the dark interspaces are mottled or with one or more blotches. In others the dark lines follow the scale rows longitudinally and pale blotches more or less obscure. Some show very dark double blotches in the dark areas along dorsal base, and in all dermal flaps of spinal dorsal whitish, many show the caudal mottled obscurely with dusky or brownish, also soft dorsal and anal. In all the pectoral rays rather pale, rays lighter than ventral.

Paracirrhites forsteri (Schneider). *Fig. 205.*

Head $2\frac{3}{4}$ to $2\frac{4}{5}$; depth $2\frac{1}{2}$ to $2\frac{4}{5}$; D. X, II, 1; A. III, 6, 1; scales 46 or 47 in lateral line to caudal base; 6 scales above lateral line to spinous dorsal origin; 5 or 6 to soft dorsal origin; 11 or 12 below to spinous anal origin; 12 or 13 large predorsal scales to occiput; snout $3\frac{1}{10}$ to $3\frac{1}{2}$ in head from upper jaw tip; eye $5\frac{1}{4}$ to 6; maxillary $2\frac{1}{6}$ to $2\frac{1}{3}$; interorbital $5\frac{2}{5}$ to 6.

Body elongately ovoid, back little elevated at predorsal, compressed; caudal peduncle length $7/8$ to 1 in least depth, which $2 \frac{3}{5}$ to $2 \frac{1}{3}$ in total head length. Head width 2 to $2\frac{1}{2}$ in its length. Snout length $4/5$ to 1 in its width. Eye elevated, impinging little on upper profile; hind edge about half its diameter before head center, much less advanced or but slightly before head center in young. Mouth large, jaws strong and mostly even, sometimes lower very slightly advanced. Maxillary to eye center, seldom slightly beyond and not to hind pupil edge; expansion $1\frac{1}{4}$ to $1 \frac{2}{5}$ in eye. Teeth strong, simple, conic in outer row, lower with 2 or 3 canines each side and 4 canines above, of which outermost largest; each jaw with inner band of villiform teeth; patch of villiform teeth on vomer, none on tongue or palatines; lower inner teeth only in front of jaw. Front nostril about last fifth in snout, about size of hind one and with cutaneous flap above with fine marginal fringe. Interorbital slightly concave. Hind preopercle edge immediately serrate; suprascapula edge above entire or only few weak serrae.

Rakers $6+11$ or 12 short knobs, spinescent, about $2/5$ of filaments, which $1 \frac{4}{5}$ in eye. Scales cycloid, strongly adherent, in longitudinal rows parallel with lateral line except convergence behind; small scales along dorsal, anal, caudal and pectoral bases; 5 rows of enlarged scales on cheeks with minute ones all about bases, which also similar above large scales on opercle and over most of head; radiating basal striae 7 or 8;

circuli very fine; lateral line slopes obliquely from shoulder to caudal base medianly; small simple tubes oblique. Third dorsal spine $2 \frac{2}{5}$ to $2 \frac{9}{10}$ in head; first dorsal ray $1 \frac{3}{4}$ to $2 \frac{1}{8}$; second anal spine $2 \frac{2}{5}$ to 3; first anal ray $1 \frac{4}{5}$ to $2 \frac{1}{5}$; caudal convex behind, $1 \frac{3}{5}$ to $1 \frac{2}{3}$; pectoral $1 \frac{2}{5}$ to $1 \frac{7}{8}$.

Color in alcohol brownish generally. Head mottled with deep brown variable ocellated spots, smaller on muzzle, some fused or linked along pectoral base and chert, even forming bars or short lines. Many spots on muzzle, in some specimens, fade pale or whitish. From above pectoral axilla to base of lower caudal lobe broad pale band, also another along dorsal bases which it largely includes, pale straw-brown to whitish. Area between extends as broad dusky or blackish band, and out on caudal base medianly. In smaller examples this may be broken somewhat as about 15 obsolete darker blotches within dark band. Spinous dorsal brownish, edge narrowly darker. Soft dorsal whitish, with sub-basal blackish blotch, gradually more extensive outward on last membranes. Anal brown. Upper caudal lobe white. Pectoral pale brown like breast and with few similar ocellate spots basally and in axil. Ventral brown. Iris golden. Length 113 to 153 mm. One from Fiji, and 6 in the Academy from Honolulu.

Paracirrhites polystictus (Günther). *Fig. 206.*

Head $2 \frac{7}{8}$; depth $3 \frac{1}{5}$; D. X, II, 1; A. III, 6, 1; scales 51 in lateral line to caudal base and 4 more large ones on latter; 6 scales above lateral line to spinous dorsal origin; 5 to soft dorsal origin, and 11 below to spinous anal origin; 12 large predorsal scales to occiput; snout 3 in head from upper jaw tip; eye $6 \frac{1}{4}$; maxillary $2 \frac{1}{2}$; interorbital 6.

Body rather slender, elongately ovoid, compressed, back scarcely elevated forward; least depth of caudal peduncle $1 \frac{1}{5}$ of its length or $2 \frac{4}{5}$ in head. Head width $2 \frac{1}{10}$ its length. Snout convex, depression in profile before nostrils; snout length greater than width. Eye elevated, center about first $\frac{2}{5}$ in head. Mouth large, jaws strong and lower slightly protrudes. Maxillary slightly beyond front eye edge, though not to pupil; expansion $1 \frac{1}{8}$ in eye. Teeth as in P. forsteri, except inner pair of upper canines largest. Front nostril about last fourth in snout little smaller than hind one, which superior and with cutaneous flap, its edges fringed. Interorbital slightly concave. Hind preopercle edge with few obsolete minute serrae above its obtuse angle. Preorbital with few coarse striae; suprascapula entire.

Rakers 6+12, short knobs, about half of filaments, which $1 \frac{2}{5}$ in eye. Scales cycloid, adherent, in longitudinal rows parallel with lateral line, except convergence behind; small scales on soft dorsal, anal, caudal and pectoral bases; 5 rows

of enlarged scales on cheek with minute ones all about bases, which also extend about large ones on opercle and over most of head; radiating basal striae 6; circuli very fine, more apical; lateral line oblique from shoulder to caudal base, arrives slightly above middle of latter; small simple tubes oblique. Second dorsal spine $3 \frac{3}{5}$ in head; first dorsal ray $2 \frac{2}{5}$; second anal spine 3; first anal ray $2 \frac{1}{10}$; caudal $1 \frac{3}{4}$, hind edge convex; pectoral $1 \frac{1}{2}$, rays i, 6 + vii; ventral 2.

Color in alcohol brownish generally, body with dark close-set spots, rather regular and but slightly variable, on abdomen and lower surface largely forming longitudinal rows which extend along junctures of scales. Fins all deep brown, showing traces of spots, except ventrals, which uniform brownish. Pectoral with many small dark axillary spots, appearing to show through. Traces of very obscure spots on head. Length 220 mm. Pomotow.

481

, APLODACTYLIDAE.

Aplodactylus punctatus Valenciennes. 753-207.

Head $4\frac{1}{4}$; depth $3\frac{1}{3}$; D. XVI, 21 1; A. III, 8, 1; scales above lateral line to caudal base; 28 scales above lateral line to spinous dorsal origin, 22 above to soft dorsal origin, 28 below to spinous anal origin; 24 larger predorsal scales to occiput; snout $2\frac{2}{3}$ in head; eye $5\frac{1}{2}$; maxillary $2\frac{1}{6}$; interorbital $3\frac{1}{10}$.

Body elongate, ovate, compressed; caudal peduncle long as deep, least depth $1\frac{5}{6}$ in head. Head width $1\frac{1}{2}$ its length. Snout convex, length about $\frac{5}{6}$ its width. Eye little elevated, hind edge about midway in head. Mouth small, transversely inferior. Maxillary to front nostril; expansion $1\frac{3}{4}$ in eye. Lips broad, coriaceous. Teeth compressed, trilobate, in several bands in each jaw; no others. From nostril twice size of hind one, closed by cutaneous flap above and below, edge of each fringed; front nostril at last third in snout. Interorbital convex. Preopercle edge entire, also bony suprascapula.

Rakers 7-14, lanceolate, 3 in filaments, $1\frac{1}{6}$ in eye; pseudobranchiae nearly large as filaments. Scales firmly adherent, cycloid, in longitudinal or horizontal rows; body scales especially smaller along bases of vertical fins and pectoral, and out on caudal basally; scales mostly absent from muzzle, preopercle flange, branchiostegal region and interorbital, which areas largely finely rugose; about

13 rows of scales on cheek to corner of preopercle ridge; basal marginal striae 12; circuli coarse, about 13; exposed areas of scales not rugose; lateral line largely concurrent with dorsal profile line, nearly midway along caudal peduncle side; small tubes simple, horizontal. Fourth dorsal spine $2 \frac{1}{3}$ in head; second dorsal ray $2 \frac{1}{4}$; third anal spine $3 \frac{2}{5}$; third anal ray $1 \frac{1}{2}$; caudal little emarginate behind, $1 \frac{1}{8}$; pectoral $1 \frac{1}{8}$; ventral $1 \frac{1}{5}$. Color in alcohol dark brown, finely spotted or dotted with darker, spots all close-set and extend thickly over fins. Spots less distinct on under surface of head than elsewhere. Length 292 mm. One without locality, probably from Peru? *Drawing by Richard of an example from Valparaiso.*
We have also examined a dried skin, 325 mm. long, from Valparaiso, in the Commercial Museum of Philadelphia. So far as details permit it agrees with the above. The dark spots on the body appear smaller and more crowded below.

SCORPIONIDAE.

Atypichthys strigatus (Günther).

Head $3 \frac{1}{2}$ to $3 \frac{3}{5}$; depth $2 \frac{1}{6}$ to $2 \frac{2}{5}$; D. XI, 15 i or 16, i; A. III, 15, i or 16, i; 78 to 82 rows of scales along lateral line to caudal base and 9 to 12 larger ones on latter; tubes 54 to 58 in lateral line to caudal base and 4 or 5 more on latter; 14 scales above lateral line to spinous dorsal origin, 13 to soft dorsal origin, 24 below to spinous anal origin; 64 to 73 predorsal scales; snout $3 \frac{1}{3}$ to $3 \frac{3}{4}$ in head; eye $2 \frac{2}{3}$ to 3; maxillary $2 \frac{2}{3}$ to $3 \frac{3}{5}$; interorbital $2 \frac{2}{3}$ to $3 \frac{1}{6}$.

Body rather deeply fusiform, well compressed; least depth of caudal peduncle 1 to $1 \frac{1}{5}$ its length, which $2 \frac{1}{3}$ to $2 \frac{2}{5}$ in head. Head width $1 \frac{3}{4}$ to $1 \frac{4}{5}$ its length. Snout conic, length $\frac{2}{3}$ to $\frac{4}{5}$ its width. Eye large, deeply ellipsoid; hind pupil edge midway in head, slightly advanced in young. Mouth small, little inclined, jaws about even. Maxillary slips below narrow preorbital; not quite to eye, or reaches front edge in young; expansion $3 \frac{1}{8}$ to $3 \frac{1}{3}$ in eye. Teeth conic, simple, in bands in jaws; several small, feeble, vomerine teeth; none elsewhere. Front nostril at last $\frac{2}{5}$ in snout; hind one midway between front one and eye. Interorbital convex. Preorbitals preopercle and suprascapular edges serrate. No opercular spine.

Rakers $8+16$, lanceolate, $\frac{1}{8}$ of filaments, which $2 \frac{1}{6}$ in eye. Scales finely ctenoid, crowded on head and over bases

of rayed dorsal, anal and caudal; basal striae 7 or 8; apical denticles 32 to 38; circuli very fine; 10 or 11 rows of scales on cheek to opercular ridge; lateral line complete, simple tubes concurrent with dorsal profile; second anal spine 2; pectoral fin $1 \frac{1}{8}$ to $1 \frac{1}{5}$; ventral $1 \frac{2}{5}$ to $1 \frac{1}{2}$.

Color in alcohol dull brownish generally, paler below and sides with traces of silvery reflections; seven deep olive-brown longitudinal bands, three uppermost much wider than interspaces, also darker than others; narrower median band from snout of caudal peduncle to caudal; fifth band much narrower and paler, from below eye to pectoral axil, very narrow and faint, along lower side of abdomen. Fins and iris brown. Length 116 to 133 mm. (caudal damaged).

Three from Sydney, of which one with a mutilated snout, apparently healed without trace of upper jaw teeth.

EPHIPPIDAE.

Ephippus argus (Gmelin). *Fig. 281.*

Head 3 to 3 1/4; depth 1 1/2 to 1 2/3; D. XI, 16, i to 18, i; A. III, 14, i to 16, i; tubes 87 to 94 in lateral line to caudal base; scales 92 to 102 in lateral line to caudal base; 24 scales above lateral line to spinous dorsal origin, 33 to 44 below to spinous anal origin; snout 3 to 3 1/3 in head; eye 3 3/5 to 4 1/5; maxillary 2 2/3 to 4; interorbital 2 1/4 to 2 3/5; head width 1 7/8 to 2. Rakers 4 11, lanceolate, pungent, 3 in filaments, which 1 1/5 in eye. Scales with none to 2 basal radiating striae, and 35 to 50 apical denticles. Color in alcohol dull brownish, mostly uniform. Body with small, scattered, deep brown spots or specks. Length 83 to 158 mm. Manila. We also examined 2 Sumatran examples in the Academy.

When fresh in arrack the Sumatran examples were dull purplish-gray. Back and upper surface marked with many round and ellipsoid spots of deeper purplish-gray, some nearly twice size of eye. Spinous dorsal membrane purplish-gray, spines burnished silvery. Soft dorsal, anal and caudal with small deep basal spots and vertical lines between rays basally. Ventral dusky. Gill-opening pale inside. Iris pale yellowish. Peritoneum whitish. The larger agrees best with Day's figure and the smaller with Bleeker's. It has a shorter caudal peduncle preorbital edge with only a few weak denticles behind, interorbital

narrower, vent little behind in depressed ventral spine length and caudal edge behind straight. Its color in arrack darker, mostly shaded with dusky or blackish. Vertical fins dark, without spots. Spots on sides of body small and vertically elongate.

We also include a fine example in the Academy from India, but with the finely spotted pattern of the Manila specimen.

Platax teira(Forskāl).

Head of a large example, labeled "South America", which erroneous as it was more likely obtained in the Philippines. It shows, the front nostril $3/5$ an eye-diameter before and slightly below third nostril; latter much nearer eye than former; about 24 rows of cheek scales to preopercle ridge; preopercle flange scaleless.

Platax orbicularis (Forskāl). ^{Fig. 282.}

Painting of an example from ^LSebukia, Fiji, by J. Drayton, June 1840.

Chaetodontidae. ^{Fig. 283.}

Forcipiger longirostris (Broussonet).
Drawing of an example from Fiji by Richard.

~~CHAETODONTIDAE~~Chaetodon setifer Forskål.

Fig. 284.

Head $2 \frac{4}{5}$ to $3 \frac{1}{4}$; depth $1 \frac{2}{5}$ to $1 \frac{3}{5}$; D. XII or XIII, 24, 1 to 26, 1; A. III, 20 1 to 21, 1; tubes in lateral line 35 to 37; 28 to 33 scales between suprascapula and caudal base; 6 to 9 scales above lateral line to spinous dorsal origin, 14 or 15 scales below to spinous anal origin; snout $2 \frac{2}{5}$ to 3 in head; eye $2 \frac{2}{3}$ to $4 \frac{1}{5}$; maxillary $3 \frac{4}{5}$ to 4; interorbital $3 \frac{2}{5}$ to $3 \frac{1}{2}$; head width 2 to $2 \frac{1}{5}$. Rakers 3+16, lanceolate, about 4 in filaments and latter $1 \frac{1}{2}$ in eye. Scales with marginal basal striae 21 and 4 to 6 auxiliaries complete; apical denticles 178 to 198. Color in alcohol faded dull brownish generally. Oblique brown lines to spinous dorsal base, below which all rest inclined at opposite angles, usually one line along each row of scales. Front edge of soft dorsal, and terminal round spot little larger than eye, blackish. Broad blackish-brown band from below eye down across cheek and lower side of head, wider below and narrowly, bordered with pale or whitish. Caudal with narrow brown submarginal line. Hind soft dorsal and soft anal edges narrowly whitish both with narrow submarginal dark line. Length 55 to 180 mm. Three without locality, ~~likely Polynesian?~~ They agree with Hawaiian and Samoan examples in the Academy. Our painting from a ~~Peacock Island~~ ^U or ~~Hendon Islands~~ example. the lagoon in ~~Hendon~~ Island, Peacock Island, September 7, 1839, by H. T. Legate. Also drawing by Richard off an example from Hull's Island. Also drawing of Pompton example by Richard.

Chaetodon vagabundus Linnaeus. Fig. 285.
 drawing of an example from Fiji,
 by J. H. Richard.

Chaetodon lineatus (Lacépède). Fig. 286
 drawing of an example from Oahu,
 by Richard.

Chaetodon ephippium Cuvier.

Head $2 \frac{1}{4}$; depth $1 \frac{2}{5}$; $D_{\frac{3}{4}}^{3}$ XII, 22; A. III, 17; tubes in lateral line 34, ending below soft dorsal posteriorly; 34 scales between suprascapula and caudal base; 9 scales above lateral line to spinous dorsal origin, 15 below to spinous anal origin; snout $2 \frac{1}{4}$ in head; eye $2 \frac{2}{5}$; maxillary $3 \frac{1}{5}$; interorbital 3; head width $2 \frac{1}{4}$. Color in alcohol with large blackish blotch over front half of soft dorsal and on back extends downward until opposite pupil. Caudal peduncle blackish. Blackish band from predorsal through eye, then down across cheek to branchiostegal region, width slightly greater than pupil. Length 25 mm. One without locality, probably Hawaiian.

Gunther's figure of the young agrees in most every respect.

Chaetodon unimaculatus Bloch.

Fig. 287.

Painting of example from Tahiti ~~or Hawaiian Islands~~ by J. Drayton, September 1839. Also drawing by Richard of a Tahiti specimen.

Chaetodon miliaris Quoy and Gaimard.

Fig. 288.

Head $3 \frac{1}{8}$ to $3 \frac{1}{5}$; depth $1 \frac{1}{2}$ to $1 \frac{3}{5}$; D. XIII, 22, 1 to 24, 1; A. III, 18, 1 or 19, 1; tubes in lateral line 35 to 42; 43 to 50 scales between suprascapula and caudal base medially; 9 to 12 scales above lateral line to spinous dorsal origin, 23 to 25 below to spinous anal origin; snout $2 \frac{4}{5}$ to $3 \frac{1}{8}$ in head; eye $2 \frac{4}{5}$ to $3 \frac{1}{4}$; maxillary 4 to $4 \frac{1}{6}$; interorbital $3 \frac{1}{4}$ to $3 \frac{1}{3}$; head width 2. Snout conic, long as wide. Rakers 7+13, short lanceolate points, about $\frac{1}{5}$ of filaments, which $1 \frac{3}{5}$ in eye. Scales with 12 to 16 basal radiating striae,

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and 68 to 85 fine apical denticles. Color in alcohol faded pale brownish generally, each scale on trunk and spinous dorsal base with darker spot, which sometimes accentuated to form 10 to 12 vertical streaks or rows of spots on back. Broad dark band from above eye until close before spinous dorsal origin. Narrower dark band from below eye across cheek. Front of caudal peduncle with broad blackish-brown band. Most dark bands bordered with pale or whitish. Length 84 to 110 mm. Seven from Maui.

Chaetodon citrinellus (Broussouet). *Fig. 289.*

Head $3 \frac{1}{8}$ to $3 \frac{2}{5}$; depth $1 \frac{3}{5}$ to $1 \frac{3}{4}$; D.XIV, 22 or 23, 1; A. III, 17, 1, once 18, 1; tubes in lateral line 35 to 38; 40 to 44 scales between suprascapula and caudal base; 7 to 9 scales above lateral line to spinous dorsal origin, 18 to 20 below to spinous anal origin; snout $2 \frac{3}{4}$ to 3 in head; eye 3 to $3 \frac{1}{4}$; maxillary $4 \frac{1}{8}$ to $4 \frac{1}{3}$; interorbital 3 to $3 \frac{1}{5}$; head width 2 to $2 \frac{1}{6}$. Rakers 4 + 11, short lanceolate points, about 4 in filaments, which $1 \frac{2}{5}$ in eye. Scales with 13 to 17 basal radiating striae, apical denticles 78 to 98. Color in alcohol pale brownish generally. Trunk with slightly inclined rows of darker brown spots, one spot to each scale, and rows following medianly in scale courses. Below eye rows of spots largely horizontal. Broad deep brown band from predorsal through eye and across cheek and head below, margined narrowly with pale or whitish. Soft dorsal with narrow dusky

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edge. Soft anal with broad dusky-brown edge, wider forward.

Length 64 to 100 mm. Four without locality, ~~likely from Fiji~~

or Samoa? *Drawing by Richard of an example from Tahiti.*

Chaetodon trifasciatus Park. *Fig. 290.*

Head $3 \frac{1}{3}$; depth $1 \frac{2}{3}$; D. XIII, 21, i; A. III, 20, i;

tubes in lateral line 29; 39 scales between suprascapula and cau-

dal base; 6 scales above lateral line to spinous dorsal origin;

14 scales below to spinous anal origin, snout $3 \frac{2}{3}$ in head;

eye 3; maxillary $3 \frac{1}{2}$; interorbital $2 \frac{1}{2}$; head width $1 \frac{7}{8}$.

Rakers 3+9 short lanceolate points, about $\frac{1}{4}$ of filaments,

which $1 \frac{1}{3}$ in eye. Scales with 11 basal radiating striae

and 100 apical denticles. Length 87 mm. One without locality,

~~likely Polynesian?~~ Our painting of an example from Opolu,

Samoa, *taken from between roots of coral in the reef, November 1, 1839, by J. Drayton. Also drawing of the*

[†]It agrees in coloration with Samoan and Sumatran examples

in the Academy. As Park's material was obtained in Sumatra,

the coloration of our Sumatran examples is of interest. When

fresh in arrack they were generally pale brown, upper and hind

half of body grayish. Trunk with 17 narrow longitudinal stripes

of dark brown, slightly inclined above behind, also upper ones

little broader. Forehead, predorsal, interorbital, and snout

brown, mandible and chin blackish. Narrower pearl-white ver-

tical parallel band extends downward from lower front of eye.

Broad blackish-brown band from side of occiput obliquely to

eye, continued below to chest, where broader and deeper, above

Spotted example by Richard.

narrowly bordered whitish each side. Behind and above narrow parallel brown stripe and then whitish one, both to eye, and finally narrow band begins below front of spinous dorsal and bends forward till behind eye and preopercle edge; also separated below eye from broad band in front by equally wide pearl-white band. Front of chest blackish-brown. Fins mostly tinged with pale yellowish. Blackish-brown band along soft dorsal base down on caudal peduncle above, widens behind. Just above longitudinal blackish line fin edge broadly dilute brownish with slightly darker border of demarcation below. Anal base grayish, then narrow longitudinal yellowish band bordering similar black band, which widens little behind. Fin edge narrowly whitish, with blackish submarginal line. Caudal edge broadly pale brownish, then narrow white cross-band followed by broader blackish cross-band, fin white basally. Peritoneum silvery, dotted and speckled with silvery. Length 127 mm.

Bleeker's figure²⁴² does not show the broad band from forehead to mouth, inclusive of chin, upper front blackish band with narrow white edges, narrow brownish band between this and one from spinous dorsal, besides spaces between bands below eyes, pearl-white. The color of the vertical fins also differs.

Day's figure²⁴³ approaches closer, except the narrow line across caudal peduncle and intervening narrow dark line on upper side of head down to upper hind eye edge.

242. Atlas Ich., vol. 6, 1876, Pl. 377 (15), fig. 1.

243. Pt.
Fishes of India, I, 1875, p. 35, Pl. 27, fig. 5

Chaetodon fremblii Bennett. Fig. 291.
Drawing of a Hawaiian example by
Richard.

Both the Samoan and Wilkes example differ from the Sumatran in the dark supraocular band joining and completely bridging the occiput; second dark band from upper hind eye edge broader and leaving narrower pale or whitish bordering lines; paler line along soft dorsal longitudinally in middle; broader dark band along anal base, which extends further out on last anal rays, also its outer edge more distinctly bordered with bright yellowish.

Chaetodon striatus Linnaeus.

Head 3; depth $1 \frac{1}{2}$; D. XII, 21, 1; A. III, 17, 1; tubes 39 in lateral line; 43 scales between suprascapula and caudal base; 7 scales above lateral line and spinous dorsal origin, 18 below to spinous anal origin; 56 predorsal scales; snout 3 in head; eye 3; maxillary $3 \frac{4}{5}$; interorbital $2 \frac{3}{4}$; head width $1 \frac{7}{8}$. Rakers 5+10, short weak points, about $\frac{1}{5}$ of filaments, which $1 \frac{1}{2}$ in eye. Scales with 11 basal radiating striae and 82 apical denticles. Color in alcohol pale brownish generally. Each row of scales on trunk with dark median streak. Dark brown band from predorsal down through eye and below across cheek, edged paler. Another wider dark brown band from front portion of spinous dorsal till behind ventral bases. Third broad dark brown band from last part of spinous dorsal down to front of anal. Fourth brown band down over caudal peduncle. Dorsals and anals edged narrowly whitish, broader on caudal and latter with submarginal dark brown band. Pectoral brown. Ventral blackish, front edges pale brown. Length 105 mm. One from Rio Janeiro.

We have compared West Indian examples in the Academy. An example early found in Delaware Bay, obtained by Dr. Richard Harlan and received from him by the Academy in 1830 is interesting in this connection. After nearly a century of preservation in alcohol this specimen is still in good condition, and has the distinct color-pattern in agreement with the above example.

Microcanthus strigatus (Valenciennes.) *Figs. 292 and 293.*

Head $1\frac{3}{8}$; depth $1\frac{3}{4}$ D.XI, 16, 1; A.III, 14, 1 or 15, 1; lateral line with 47 to 52 rows of scales to caudal base; pores in lateral line 38 to 48 to caudal base; 12 to 14 scales above lateral line to spinous dorsal origin, 23 below to spinous anal origin; about 40 to 50 predorsal scales; snout $3\frac{2}{5}$ to $3\frac{1}{2}$ in head; eye $2\frac{3}{4}$ to $3\frac{2}{5}$; maxillary $3\frac{2}{3}$ to $3\frac{4}{5}$; interorbital $3\frac{2}{3}$ to $4\frac{1}{4}$; head width 2 to $2\frac{1}{8}$. Snout conic, long as wide. Hind pupil edge midway in head length. Mouth small, jaws about even. Maxillary reaches eye; expansion 3 to $3\frac{1}{2}$ in eye. Front nostril at last third in snout. Interorbital convex. Preopercle and suprascapula serrate; preorbital entire; opercle with small spine. Rakers $6\frac{1}{2}$ to 13, lanceolate, 2 in filaments, which 2 in eye. Scales with 4 to 7 basal radiating striae; small apical denticles 21 to 62; circuli very fine; 11 rows of scales on cheek to lower hind marginal angle of preopercle; lateral line complete; slender tubes simple and small. Fourth dorsal spine $1\frac{1}{2}$ to $1\frac{3}{4}$ in head; second

anal spine $1 \frac{4}{5}$ to 2; pectoral $1 \frac{1}{4}$ to $1 \frac{1}{3}$; ventral $1 \frac{1}{5}$ to $1 \frac{1}{4}$.

Color in alcohol pale brown generally. Six mummy-brown bands, little inclined from horizontal to slope backward; lowest band more narrow than others, passes from eye to pectoral base and then to front of anal; next band above passes from forehead to hind part of soft anal; uppermost band on spinous dorsals and others extend behind on soft dorsal. Length 90 to 123 mm. Three from Oahu. *Drawings of 2 examples from Oahu and 2 from Maui, by Richard.*
Heniochus acuminatus (Linnaeus). *Figs. 294 and 295.*

Head $2 \frac{1}{2}$ to $3 \frac{1}{10}$; depth $1 \frac{1}{5}$ to $1 \frac{4}{5}$; D. XI or XII, 23, 1 to 25, 1; A. III, 18, 1; scales 47 to 50 in lateral line to caudal base; 10 or 11 scales above lateral line to spinous dorsal origin; snout 3 to $3 \frac{1}{2}$ in head; eye $2 \frac{1}{2}$ to 3; maxillary $3 \frac{7}{8}$ to $4 \frac{7}{8}$; interorbital $2 \frac{2}{5}$ to $3 \frac{3}{4}$; head width 2 to $2 \frac{1}{8}$. Rakers 3 to ~~5~~ 8 short rudimentary points. Scales with 9 or 10 basal radiating striae, and 39 to 43 apical denticles. Length 38 to 175 mm. Two from Fiji. We also include an adult from Sumatra a paratype of *H. diphrentes* Jordan²⁴⁴, in the Academy. When compared these are not found to differ in any specific way from the Fiji examples.

Color in arrack of the Sumatran example, generally white when fresh. Broad blackish-brown band from front of spinous dorsal to ventral origin, includes ventral widens behind to include spinous anal and front edge of soft anal. Second band slopes to hind half of soft anal, where it joins dark edge ex-

²⁴⁴. Proc. U.S. Nat. Mus., vol. 26, 1902, p. 694, fig. 3.

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tending from front band. Peritoneum silvery.

Our smallest example is interesting as showing nearly completed or perfect metamorphosis from the Tholichthys stage. It shows, in color pattern, the median oblique white band much broader below and narrowed somewhat above, as compared with the other specimens.

Libely Lva excelsa
Jordan is synonymous.

Holacanthus bicolor Bloch. *Fiji 2960*

Head $3 \frac{2}{3}$; depth 2; D. XV, 14, 1; A. III, 17, 1; scales (pockets) 52 between suprascapula and caudal base; about 35 (larger) predorsal scales; snout 3 in head; eye $4 \frac{1}{4}$; inter-orbital $3 \frac{1}{5}$; head width $1 \frac{2}{3}$. Snout conic, long as wide. Rakers 1 10, short broad points, about 4 in filaments, which $1 \frac{2}{3}$ in eye. Scales with 6 to 9 basal radiating striae; 28 to 32 stray apical spines, each with strong midrib as rather long keel over scale terminally. Color in alcohol strongly contrasted/ Nearly front half of body, including pectoral, ventral and all caudal whitish, rest deep blackish-brown. Broad blackish-brown band from eye up to occiput, joins opposite one, with narrow pale marginal line. Also front of dark area on trunk with narrow pale marginal line. Length 110 mm.

Manila? drawing by Richard of an example from Fiji.

ZANCLIDAE.

Zanclus canescens (Linnaeus). *Figs - 297 and 298.*

Head $2 \frac{1}{4}$ to $2 \frac{2}{5}$; depth 1 to $1 \frac{1}{10}$; D. II, 46 to 48; A. II, 34 or 35; snout $1 \frac{3}{5}$ to $1 \frac{2}{3}$ in head; eye 3 to 4; maxillary $4 \frac{1}{4}$ to $4 \frac{1}{3}$; interorbital $2 \frac{4}{5}$ to $4 \frac{1}{4}$; head width $2 \frac{2}{5}$ to $3 \frac{1}{8}$. Color in alcohol with 2 broad dark brown vertical broad bands, and pale lines characteristic of the species.

Young example largely uniform dark brown, doubtless due to preservation. Length 60 to 125 mm. Three from Samoa? and one

Hawaiian. *Three drawings by Richard, one each from Samoa, Hawaiian Islands and Pomotou. Also drawing compared with Hawaiian examples in the Academy and agrees in every way.*

ACANTHURIDAE.

Hepatus *fuliginosus* (Lesson). *Figs. 299 and 300.*
~~matoides (Valenciennes).~~

Head $3 \frac{1}{5}$; depth 2; D. IX, 26, 1; A. III, 24, 1; scales about 133 along, below and adjacent to lateral line to caudal base; snout $1 \frac{1}{2}$ in head; eye 4; maxillary 4; interorbital 3; head width $2 \frac{1}{6}$. Rakers 10+12 weak slender rudimentary points. Scales without basal striae; apical denticles 12 to 15. Color in alcohol uniform hair-brown above to smoky-gray on abdomen and

lower surface of head. Fins colored like back. Length 172 mm. One without locality, likely Polynesian? *ok*

Our painting represents an example from *Sebatia*, Fiji, *June 1840, by J. Drayton. Also drawing of an example from Oahu and 1 from Fiji, both by Richard.*

Our example agrees essentially with the account of the type of Acanthurus matoides by Sauvage. ²⁴⁵

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Hepatus achilles (Shaw). *Fig. 301-*

Painting of an example from Wales Island, Pomotu, *Sydney*.

August 25, 1840, by J. Alcockton. Also drawing the fish for 2 examples from Pomotu and 1 from Hill Island.

Hepatus dussumieri (Valenciennes).

Head $2 \frac{3}{4}$ to $2 \frac{4}{5}$; depth $1 \frac{1}{2}$ to $1 \frac{3}{5}$; D. IX, 25, 1;
A. III, 24, 1 or 25, 1; snout $1 \frac{4}{5}$ to $1 \frac{7}{8}$ in head; eye $2 \frac{1}{2}$
to $2 \frac{3}{4}$; maxillary $2 \frac{7}{8}$ to $3 \frac{1}{3}$; interorbital 3 to $3 \frac{4}{5}$;
head width $2 \frac{2}{5}$ to 3. Rakers 5 + 15 short lanceolate rudimentary
points. Scales without basal radiating striae; 4 to 6 apical
denticles. Color in alcohol largely dull uniform blackish-brown,
fins all equally dark and without trace of pale markings.
Length 43 to 57 mm. Two from the Hawaiian Islands.

Our examples show no trace of the pale or whitish band
from the front of spinous dorsal down to opercles, and the one
across caudal peduncle as figured by Jordan and Evermann²⁴⁶.
They are further of interest in comparison with 5 Hawaiian ex-
amples recorded by Fowler as Teuthis annularis²⁴⁷. They exhibit
a remarkable extent of variation, which at first may be construed
as resolving into 2 species, the other certainly representing
Acanthurus lineolatus Gunther,²⁴⁸ Slater named Teuthis atramen-
tus by Jordan and Evermann.

246 Bull U.S. Fish Com., vol. 33, part 1, 1903 (1905), p. 386, fig. 167

247. Proc. Acad. Nat. Sci. Phila., 1900, p. 513.

248. Journ. Mus. Godeffroy, vol. 1, 1875, p. 112, Pl. 73, fig. A. heft 4,

Hepatus lineolatus (Valenciennes). Fig. 303.

Drawing of an example from ^{Talitha} by Richard. A figure, also by Richard, of an example from Fiji, differs only in rather coarse longitudinal whitish lines, some of which are broken or even formed as slight verruculations longitudinally. Possibly it may have been intended for the present species.

Their body depth is $1 \frac{3}{5}$ to $2 \frac{1}{2}$. Three of these examples, including the extremes in depth, show a dark or blackish blotch at bases of last dorsal and last anal rays. The eye and spine on caudal peduncle are also quite variable, and may equal the eye or be only half so long. Another series of Hawaiian examples in the Academy, admitted as H. dussumieri, also show similar variations.

Hepatus ^{leucopareius} ~~umbra~~ (Jenkins). *Fig. 302.*

Head 3; depth $1 \frac{7}{8}$; D. IX, 24, 1; A. III, 24, 1; scales about 135 along and close below lateral line to caudal base; snout $1 \frac{3}{4}$ in head; eye 3; maxillary 4; interorbitals 3; head width 2. Rakers 8-15, short rudimentary points. Scales without basal striae; apical denticles 7 or 8. Color in alcohol dull blackish-brown. Fins snuff-brown. Caudal base dull grayish. Dorsal (damaged) and anal (much faded) with traces of at least 5 darker longitudinal lines. Length 83 mm. One without locality, doubtless from Polynesia?

Hepatus sandvicensis (Streets). *Fig. 304.*

Head $3 \frac{1}{4}$; depth $1 \frac{7}{8}$; D. IX, 23, 1; A. III, 21, 1; scales about 155 along and close below lateral line to caudal base; snout $1 \frac{2}{5}$ in head; eye $4 \frac{1}{10}$; maxillary $4 \frac{1}{4}$; interorbital $3 \frac{1}{10}$; head width $3 \frac{1}{10}$. Rakers 5-15, short rudimentary weak, points. Scales without basal striae; 10 or 11 apical denticles. Color in alcohol back snuff-brown, fading grayish below. Five dark vandyke-brown narrow cross-bands, first through eye forward along preopercle edge, last short blotch on upper

edge of caudal peduncle, others on trunk. Anal edge pale.

Length 178 mm. One without data, likely Hawaiian?

drawing of an example from Hull's Island by Richard. Also 6 drawings, 4 colored

Comparison with examples in the Academy from Samoa,

Thornton Island and Galapagos Islands, of H. triostegus,

show that species with the second dark vertical band down

to pectoral base, and not extended down on side of chest as

in the above example of H. sandwicensis.

A drawing of this form from Hull's Island by Richard.

Hepatus triostegus (Linnaeus). *Fig 305 and 306.*

Sketch and drawing

Painting of example from Raraka by W. H. Dargal. Also

sketch by Drayton of an example from Opofoe, November 1, 1839. Four

Zebrasoma veliferum (Bloch). *Fig 307.*

Head 2 5/6; depth 1 1/2; D. I, 35, 1; A. I, 28; snout

1 3/4 in head; eye 2 4/5; interorbital 3; head width 2 1/8.

Rakers 4 5 short points. Scales as simple dermal denticles,

moderately short conic points. Color in alcohol white to pale

olive-gray generally. Six broad transverse olive-gray bands.

Fins pale brown. Length 68 mm. Samoa. *Three drawings by*

Richard, 1 Hawaiian Islands? and the others Samoa.

Jordan and Evermann give 5 dorsal and 3 anal spines, but

our example shows only a single spine at the front of each fin,

all the other rays split.

Acanthurus unicornis (Forsk.)

One 73 mm. long, from Oahu. It agrees best with Günther's

figure of Naseus unicornis. ²⁴⁹

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Journ. Mus. Godeffroy, vol. 1, heft 4, 1875, Pl. 78, fig. c.

drawings by Richard, 1 from Samoa, 1 from

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Zebrassoma flavescens (Bennett). Fig. 309 and 310.
Drawing by Richard of an example from Samoa and a young one from Fiji.

Ctenochaetus strigosus (Bennett). Fig. 311.
Drawing of an example from Maui by Richard.

Acanthurus literatus Schneider. Fig. 312 and 313.
Drawing of an example by Richard from one taken at Opohu, Samoa, one from Fiji and young from Oahu. Sketch by Drayton of an example from Opohu in November 1839. Figure by W. H. Stengel, also of example from Opohu.

Acanthurus annulatus (Quoy and Gaimard). Fig. 314.
Drawing of an example from Fiji by Richard and another from same place by Stengel. Also sketch by Drayton, June 1840, of example from Labridia, Fiji. The notes give it as purple brown generally. Pupil black, iris blue black. Spinous dorsal bluish black, soft dorsal dark root with white edge. Anal bluish black with white edge; caudal similar. Pectoral pale blue black, with submarginal yellowish band. All the figures show the hind

pectoral edge pale.

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Acanthurus unicornis (Forsk.) Figs. 315 to 317

Line 73 mm. long, from Oahu. It agrees best with Günther's figure of Nasus unicornis. 249

Drawing by Richard of an example from Oahu, one from Maui, one from Tahiti and one from Fiji. Also apparently 2 copies of the Fijian fish, one by Dougal, besides the original sketch. The last is labeled Mudwatta, Fiji, August 1840.

Body hister with slatte reflections. Iris brown and gold. Dorsals with pale blue ground color, with reddish orange bands blended; upper edges of fins molt blue; rays and spines color of body. Anal like dorsals. Caudal peduncle and caudal base fleshy color and bases of caudal spines broadly bright molt. Fina caudal edge broadly yellow. Pectoral hister, more blue than body color. Ventral light brown, with white or pale blue marks.

SIGANIDAE.

Siganus marmoratus (Quoy and Gaimard).

Head $3 \frac{3}{4}$ to $3 \frac{7}{8}$; depth $2 \frac{1}{2}$ to $2 \frac{2}{3}$; D. (I) XIII, 10, 1; A. VII, 9, 1; snout $2 \frac{1}{2}$ to $2 \frac{2}{3}$ in head; eye $2 \frac{1}{2}$ to $2 \frac{3}{4}$ in head; maxillary $3 \frac{1}{5}$ to $3 \frac{2}{5}$; interorbital $3 \frac{1}{3}$ to $3 \frac{2}{5}$; head width $1 \frac{7}{8}$. Cheek scales in 6 to 9 rows, indistinct in young. Caudal moderately emarginate behind. Color in alcohol umber-brown on back and upper surfaces, fading smoke-gray or whitish below. Body everywhere with pale or whitish vermiculate lines, quite variable, numerous or rather sparse, also variably broken or incomplete. Some extend on caudal basally. Fins brownish, outer portion of spinous dorsal mottled with darker. Length 85 to 150 mm. Four from Fiji and one without locality.

Amphacanthus marmoratus Quoy and Gaimard²⁵⁰ is figured without cheek scales, caudal moderately emarginate, dorsal, anal and ventral unicolor, markings similar, fine and largely disposed longitudinally, below, none on head. Gunther's rather crude figure of Teuthis striolata²⁵¹ largely agrees.

Amphacanthus punctatus Schneider is identified as the earliest name for Siganus hexagonatus Bleeker, by Jordan and Seale, though later questioned by Weber.

²⁵⁰

Voy. Uranie, 1825, - .367, Pl. 62, figs. 1-2. Guam.

²⁵¹

Journ. Mus. Godeffroy, vol. 2, heft 243, 1874, p. 89, Pl. 59 A.

Siganus dolistatus (Valenciennes). *Fig. - 318.*

Head $3 \frac{4}{5}$; depth $2 \frac{1}{3}$; D. (I) XIII, 10, 1; A. VII, 9, 1; snout $2 \frac{1}{8}$ in head; eye $3 \frac{1}{8}$; maxillary 4; interorbital $3 \frac{1}{8}$; head width 2. Cheek with 11 rows of scales across widest squamous area from preopercle angle. Scales with 40 to 82 circuli, usual pattern. Back and upper surface dull fuscous in alcohol. Lower surface smoke-gray. Fins uniform dull brown, ventral and anal spines burnished with smoke-gray. On trunk 28 vertical pale lines, about last 6 bent at right angles and extend longitudinally along caudal peduncle side. Broader pale lines transversely across head, widest at occipital region. About 8 pale lines across opercle obliquely. Length 178 mm. Fiji.

Siganus argenteus (Quoy and Gaimard). *Fig. - 319.*

Head 4; depth $3 \frac{2}{3}$; D. (I) XII, 10, 1; A. VII, 9, 1; snout $2 \frac{2}{3}$ in head; eye $3 \frac{1}{8}$; maxillary $3 \frac{3}{4}$; interorbital 3; head width 2. Caudal forked. Color in alcohol upper surface dull uniform brownish, paler below. Fins dull brown. Dark median basal area on each caudal lobe. Length 55 mm. Fiji. *Two drawings by Richard of examples from Fiji.*

Amphacanthus argenteus Quoy and Gaimard.²⁵² is based on a young example, with uniform caudal, thirteen dorsal spines, and smaller eye than our specimen.

²⁵²
Voy. Uranie, Zool., 1825, p. 368, Pl. 62, fig. 3. Guam.

Amphacanthus punctatus Schneider is identified as the earliest name for Siganus hexagonatus Bleeker, by Jordan and Seale, though later questioned by Weber.

Siganus vitianus (Sauvage).

Head $3 \frac{1}{4}$ to $3 \frac{1}{2}$; depth 3 to $3 \frac{1}{6}$; D. (I) XIII, 10, 1; A. VII, 9, 1; snout 3 to $3 \frac{1}{8}$ in head; eye $2 \frac{1}{2}$; maxillary 3; interorbital 3; head width 2; Preorbital and temporal region striate. Color in alcohol uniform dull brownish generally, paler below. Fins dull brown. Length 43 to 46 mm. Two from Fiji.

Teuthis vitianus Sauvage is based on an example 200 mm. long.²⁵³ It is described with 3 or 4 irregular bands at the throat, spinous dorsal with dull spots, bases of soft dorsal rays black, anal with 3 undulate bands in front and 3 transverse bands on caudal.

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Bull. Soc. Philomath. Paris, vol. 6, 1881, p. 173. Fiji.

Siganus rivulatus (Forskål). *Fig. 320*

Head $3 \frac{7}{8}$; depth $2 \frac{1}{4}$; D. (I) XIII, 10, 1; A. VII, 9, 1; snout $2 \frac{1}{3}$ in head; eye $3 \frac{1}{2}$; maxillary $3 \frac{1}{2}$; interorbital $3 \frac{1}{2}$; head width 2; Scales very small, non-striate, simply cycloid, with obscure, fine and complete circuli. Color in alcohol uniform pale umber above, grayish beneath. Fins and iris mostly like back, latter little brighter. Abdomen, ventral and anal spines burnished with whitish. Length 143 mm. Sydney.

Possibly Teuthis oligostictus Kner,²⁵⁴ may be the young. It is described with head $3 \frac{1}{2}$ in total length and dark spot below the lateral line.

254.

Sitz. Ak. Wiss. Wien, vol. 58, abth. 1, 1868, p. 30. Kanathia (Viti Islands).

Siganus doliatus (Valenciennes) Figs. 321
and 322

Three from Fiji and one from Penatou,
drawings by Richard. In the smaller
or younger ones the vermiculations are
fewer and more spaced.

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Siganus rostratus (Valenciennes). *Fiji. 323.*

Head 4; depth $2 \frac{7}{8}$; D. (I) XIII, 10, 1; A. VII, 9, 1; snout $2 \frac{1}{3}$ in head; eye $3 \frac{1}{5}$; maxillary $3 \frac{2}{3}$; interorbital $3 \frac{1}{3}$; head width $2 \frac{1}{10}$. Scales small, of usual pattern, circuli 38 to 40. Caudal deeply forked. Color in alcohol hair-brown on back to pale dray-gray and whitish below. Upper surface of head obscurely vermiculated with slightly darker brown than general color. Traces of very obscure mottling, of slightly darker, on back. Iris dull brown. Spinous dorsal and anal pale, blotched medianly with deep brownish. Ventral whitish, with large deep brown blotches. Ventral and anal spines burnished with white. Length 203 mm. Fiji.

SCORPAENIDAE.

Sebastodes mystinus (Jordan and Gilbert).

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth $2 \frac{3}{4}$ to $2 \frac{5}{6}$; D. XII, I, 16; A. III, 9, 11; P. 1, 7, ix; tubes in lateral line about 55 to caudal base; 73 to 75? rows of scales along lateral line to caudal base; 9 scales above lateral line to soft dorsal origin; snout $3 \frac{7}{8}$ to $4 \frac{1}{5}$ in head from upper jaw tip; eye $4 \frac{1}{5}$ to $4 \frac{3}{5}$; maxillary $2 \frac{1}{4}$ to $2 \frac{1}{3}$; interorbital $2 \frac{3}{4}$ to $3 \frac{1}{3}$; head width $2 \frac{1}{8}$ to $2 \frac{1}{5}$ in total head length. Upper profile of head oblique, straight. Lower jaw well protruded. Maxillary to hind pupil edge. Interorbital convex. Preopercle with 5 strong flat spines, second and third largest. Opercle with 2 strong spines. Preocular spine small and low parietal ridges slightly curved. Rakers 10 23, lanceolate, equal filaments or $1 \frac{1}{2}$ in eye. Scales with 9 to 11 basal radiating striae; apical denticles 50 to 52. Color in alcohol umber-brown generally, paler only on belly and breast. Fins all umber. Length 240 to 333 mm. Two from northwest coast of North America, probably California or Oregon?

Sebastodes rosaceus (Girard).

Head $2 \frac{2}{5}$; depth $2 \frac{4}{5}$; D. XII, 1, 14; A. III, 7; P. 1, 18; tubes in lateral line 40 to caudal base; 67 rows of scales along lateral line to caudal base; 10 scales above lateral line to soft dorsal origin; 22 scales below lateral line to spinous anal origin; snout 4 in head from upper jaw tip; eye $4 \frac{1}{3}$;

maxillary $2 \frac{1}{10}$; interorbital $6 \frac{1}{2}$; head width $2 \frac{1}{5}$ in total head length. Maxillary not quite to hind eye edge. Lower jaw slightly protrudes. Interorbital little concave. Cranial ridges and spine rather strong. Supraocular spine well developed. Raker 11 21, lanceolate, $1 \frac{1}{8}$ in filaments, which $1 \frac{3}{4}$ in eye. Few very small scales on maxillary and preorbital; mandible and snout naked; scales with 7 to 10 basal radiating striae, apical denticles 30 to 40. Dorsal spines low, longest much less than half of head. Color in alcohol faded dull uniform brownish. Length 177 mm. One, without locality, doubtless from California or Oregon?

Sebastodes chamaco (Evermann and Radcliffe). 7-24-36/.

Head $2 \frac{2}{5}$; depth $2 \frac{7}{8}$; D. XII, I, 14; A. III, 7; P. i, 17; tubes in lateral line about 40 to caudal base; 65 rows of scales along lateral line to caudal base; 12 scales above lateral line to soft dorsal origin; 20 scales below lateral line to spinous anal origin; snout $4 \frac{1}{4}$ in head from upper jaw tip; eye $4 \frac{3}{5}$; maxillary 2; interorbital 7; head width $2 \frac{1}{4}$ in total head length. Snout about broad as long. Interorbital concave; ridges and spines on head all distinct; 4 moderate preopercular spines. Rakers 9 22, lanceolate, $1 \frac{1}{2}$ in filaments, which $1 \frac{1}{3}$ in eye. Few small scales on preorbital, maxillary and mandible naked; scales with 7 to 9 basal radiating striae, sometimes 1 to 5 more accessory; apical denticles 24 to 36. Dorsal spines low, longest little over $\frac{1}{4}$ of head; second anal spine longer and stronger than third.

Color in alcohol umber generally, little paler on head below and belly. Back and head clouded with darker and dusky. Fins dull brown, with blackish cloudings on membranes of spinous

dorsal. Length 215 mm. Callao. Drawing by Richard of an example from Callao and 1 from Ithaca.

It is quite probable the present species may not be found eventually distinct from S. darwini (Cramer). The characters used for its separation by Evermann and Radcliffe are not conclusive as to the validity of the 2 forms.

Scorpaenopsis gibbosa (Schneider). ^{Fig. 362}
 Drawing of an example from Fiji,
 unsigned. Also pencil sketch.

Sebastapistes asperella (Bennett). ^{Fig. 43}
 Three drawings without data, though
 doubtless Hawaiian, ~~as~~ unsigned.

Sebastopistes tristis(Klunzinger).

Head $2 \frac{1}{5}$ to $2 \frac{1}{4}$; depth $2 \frac{1}{4}$ to 3; D. XI, I, 10, once 9; A.III, 5; pores 20 or 21 in lateral line, incomplete on caudal peduncle; scales 34 to 37 in lateral line to caudal base, and 3 (damaged) more on latter; 5 scales above lateral line to soft dorsal origin, 13 below to spinous anal origin; snout $3 \frac{1}{5}$ to $3 \frac{3}{4}$ in head; eye 3 to $3 \frac{3}{4}$; maxillary $1 \frac{7}{8}$ to 2; interorbital 5 to 6, head width $2 \frac{1}{8}$ to $2 \frac{2}{5}$ in its total length. Snout convex, length $\frac{4}{5}$ to $\frac{7}{8}$ its width. Maxillary to hind pupil edge. Palatine teeth present. Interorbital concave, though no deep occipital pit. Rakers 5 7 short tubercles, $\frac{2}{5}$ of filaments, which half of eye. Scales with 8 to 10 basal radiating striae, apical denticles 23 to 26; body and head with small scattered dermal flaps; supraorbital cirrus present or absent. Second anal spine longest. Color in alcohol faded dull brown. Body variegated with paler or darker/ Edge of spinous dorsal, from seventh to tenth spine,

with blackish blotch. Anal largely blackish. Length 35 to 55 mm. Four from Fiji.

The original account of Scorpaena strongia²⁶³ Cuvier is very imperfect, though such characters as are given agree with our material. Lesson next mentions the species²⁶⁴, though without much additional information. A little later Quoy and Gaimard figure the species²⁶⁵. In lieu of no detailed account of the type it appears to us best to rely on this figure as far as it permits. In the text they give D. XII, 8 and A. III, 7. Their figure shows the following: about 40 rows of scales indicated along the lateral line, counting the last few apparently on caudal base; the maxillary almost extending until opposite hind eye edge; spinous dorsal marked with 2 brown blotches, but without a black blotch, soft dorsal and caudal also with 2 brown cross-bands; anal with large brown blotch, likewise ventral; pectoral with 4 brown cross-lines.

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Hist. Nat. Poiss., vol. 4, 1829, p. 237

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Voy. Coquille, Zool., vol. 2, part 1, 1830, p. 213.

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Voy. Astrolabe, Zool., vol. 3, p. 834, p. 688, Pl. 11, fig. 2.

Scorpaena asperella Bennett²⁶⁶ is very imperfectly described, the color and filaments only being noted. With reference to the former the spinal dorsal is said to have a red blotch in front and the ends of some of the posterior spines blackish. The long maxillary, so characteristic of Sebastapistes corallicola Jenkins is not mentioned. Jordan and Everman, in compiling Bennett's description,²⁶⁷ give the erroneous impression that the anal fin has 8 rays, whereas Bennett clearly intends the number to include both spines and divided rays, thus the formula is A. III, 5.

Scorpaena tristis Klunzinger²⁶⁸ has the lateral line 38 and the under jaw with a labyrinth of dark spots. As Sebastes strongia he describes Red Sea material with lateral line 35, though later²⁶⁹ he gives lateral line 47.

Scorpaena ballieni Valiiant and Sauvage²⁷⁰ appears the same as our Fiji material. We have compared 3 small examples in the Academy, Hawaiian, and identified by Jordan and Evermann as S. ballieni. They agree in squamation and largely in coloration. The latter is certainly very suggestive of Quoy and Gaimard's figure of Scorpaena strongia. They show the lower jaw pale or only with a few pale cross-bars or blotches. The supraorbital tentacle may be present or absent, likewise the black blotch in the spinous dorsal.

266 Zool. Journ., vol. 4, 1829, p. 40. Sandwich Islands.

267 Bull. U.S. Fish Com., vol. 23, part 1, 1903 (1905), p. 458.

268 Verh. Z. B. Ges. Wien, vol. 20, 1870, p. 802.

269 Fische Roth. Meeres, vol. 1, 1884, p. 71.

270 Rev. Mag. Zool., (3) vol. 3, 1875, p. 278, Sandwich Islands.

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Scorpaena bakeri Seale²⁷¹ agrees with our material in most all respects. In the original account it is stated "the under side of head is white with about 6 distinct brownish cross bands half as wide as interspaces".

Likely Sebastapistes laotale Jordan and Seale is another synonym. These writers say "were it not for the plain colored lower parts of the head, in the figure of Quoy and Gaimard, we should regard Sebastapistes laotale as this species", though the uniform chin may have been due to preservation. The lateral line of S. laotale is given as 22 and the figure shows 43 rows of scales to the caudal base, with 2 more on latter.

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Occas. Pap. Bishop Mus., vol. 1, No. 3, 1900 (1901), p. 120.

Sebastopsis guamensis (Quoy and Gaimard).
Fig. 365a.

Painting by Drayton of an example from
Gutierrez, October 16, 1839.

Scorpaena brasiliensis Cuvier. Fig. 366.

Head $2\frac{1}{2}$; depth 3; D. XI, I, 10; A. III, 5, 1; tubes 23 in lateral line to caudal base and 2 more on latter; scales 44 in lateral line to caudal base and 4 more on latter; 8 scales above lateral line to soft dorsal origin, 19 below to spinous anal origin; snout $3\frac{7}{8}$ in head, measured from upper jaw tip; eye $4\frac{1}{4}$; maxillary $2\frac{1}{8}$; interorbital $5\frac{4}{5}$. Head width $1\frac{7}{8}$ its length.

Snout convex, long as wide. Lower jaw protruded. Maxillary to hind eye edge. Interorbital deeply concave. Head well armed and ridges prominent. No supraorbital tentacle. Rakers ~~7~~ 10, low compressed tubercles, 2 in filaments, which $1\frac{7}{8}$ in eye. Scales

with 15 to 17 basal radiating striae, and circuli quite fine; head scaly, also prepectoral region. Second anal spine little shorter than third. Color in alcohol dull brown, variegated with paler and darker, some on head and fins. Length 185 mm. Rio

Janeiro. *Painting by Drayton of an example from Rio Janeiro, December 1838. Also drawing of a Rio Janeiro fish.*
Scorpaena histrio ~~Jaynes~~ *Jenyns*

Head $2 \frac{1}{4}$ to $2 \frac{2}{5}$; depth $2 \frac{3}{5}$ to 3; D. XI, I, 10; A. III, 5, 1, P. 1, 4 to 6, ix to xi; scales (pockets) 38 to 42 in lateral line to caudal base and 3 or 4? more on latter; tubes 22 to 25 in lateral line to caudal base; 5 or 6 scales above lateral line to soft dorsal origin, 11 to 13 below to spinous anal origin; predorsal scales 3 or 4; snout $3 \frac{1}{5}$ to 4 in head; eye 4 to $5 \frac{1}{4}$; maxillary $1 \frac{3}{4}$ to $1 \frac{7}{8}$; interorbital $5 \frac{2}{3}$ to $7 \frac{1}{6}$; head width $1 \frac{4}{5}$ to $1 \frac{7}{8}$. Snout convex, length $\frac{2}{3}$ to $\frac{4}{5}$ its width. Maxillary extends slightly beyond eye; expansion $1 \frac{1}{5}$ to $1 \frac{1}{2}$ in eye/ Bands of fine teeth in jaws on vomer and palatines. Interorbital deeply concave; occipital pit deep. Rakers 4 10 or 11, short tubercles, about $\frac{2}{5}$ to $\frac{1}{2}$ of filaments, which $1 \frac{3}{4}$ in eye. Scales with 7 to 14 basal radiating striae; apical denticles 15 to 35. Front supraorbital tentacle $\frac{2}{5}$ of eye; hind one equals eye, broad, flat and edges fringed irregularly. Head and trunk largely with cutaneous flaps.

Color in alcohol dull brown generally. Head and trunk above with many white blotches and most cutaneous flaps whitish. Also many marblings of deeper brown scattered about upper surface. Under surface of head, and ventrals, finely specked with white.

Fins all variegated with darker brown and whitish, like back. Usually a blackish blotch marginally from eighth to tenth dorsal spines on membranes. Length 63 to 114 mm. One from Callao, Peru, and 3 without locality, doubtless from Peru.

Our examples agree with Jenyns' figure, except he does not show the dark marginal blotch on spinous dorsal. This is present in all our examples.

Scorpaena cruenta Richardson. *Fig. 367.*

Head $2 \frac{1}{4}$; depth $2 \frac{4}{5}$; D. X, I, 9; A. III, 5; tubes 21 in lateral line to caudal base and 2 more on latter; scales 49 in lateral line to caudal base and 4 more on latter; 10 scales above lateral line to soft dorsal origin, 21 scales below to spinous anal origin; snout $2 \frac{9}{10}$ in head measured from upper jaw tip; eye $5 \frac{1}{3}$; maxillary 2; interorbital $7 \frac{2}{3}$. Head width $1 \frac{4}{5}$ in its total length. Snout convex, width $1 \frac{1}{8}$ its length. Maxillary to hind pupil edge; expansion $1 \frac{1}{2}$ in eye. Interorbital deeply concave. Head with many thorns and ridges; rather deep pit at occiput. Supraocular tentacle from median or highest supercilliary spine. Rakers 6+8 short tubercles, half of filaments, which 2 in eye. Scales with 5 to 7 radiating basal striae; circuli fine. Color in alcohol faded dull brown, with 5 obscure vertical bands, some extending on dorsals. Pectoral with small obscure spots. Anal and caudal with some dark mottling. Spinous dorsal marginal blackish blotch from sixth to eighth spines. Length 215 mm.

Sudney. *Painting of an example taken at*

Sydney, January 1840, by Drayton.
Also drawing by J. Richardson of an example
from Sydney.

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Richardson's profile figure of S. *militaris*²⁷² shows the second supraorbital spine nearly midway between the first and third, though in his dorsal view of the head it more nearly resembles our example. The tentacle in our specimen, is also much longer, or very little less than the eye-diameter.

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Voy. Erebus and Terror, Ich., 1844, Pl. 14, figs. 1-2.

Pterois radiata Cuvier.

Fig. 368.

Head $2 \frac{2}{5}$ to $2 \frac{1}{2}$; depth $2 \frac{2}{3}$ to 3; D. XI, I, 12, i; A. III, 6, i; P. 15; scales in 46 rows along lateral line to caudal base; pores about 24 in lateral line to caudal base; 9 scales above lateral line to soft dorsal origin, 14 below to spinous anal origin; 5 predorsal scales; snout 3 to $3 \frac{2}{3}$ in head from upper jaw tip; eye 3 to $3 \frac{1}{6}$; maxillary $2 \frac{1}{4}$ to $2 \frac{3}{4}$; interorbital 5 to 6; head width 2 to $2 \frac{1}{3}$ in total head length. Snout convex, length about $\frac{7}{8}$ its width. Eye advanced, hind pupil edge about midway in total head length. Mouth moderate, lower jaw slightly protruded. Maxillary reaches front pupil edge; expansion $1 \frac{4}{5}$ in eye. Teeth fine, in bands in jaws and on vomer, none on palatines. Interorbital deeply concave. Head spines distinct; small spine above nostril; small antero-orbital and broad postero-orbital. Supraocular tentacle twice eye-diameter. Rakers iv 7, iv, lanceolate, rather obtuse and asperous, longest $\frac{2}{3}$ of filaments, which $2 \frac{1}{2}$ in eye. Scales moderate; basal radiating striae 8 to 11; apical denticles 19 to 23; circuli fine.

Color in alcohol faded chiefly deep brown. Oblique dark brown band across eye toward pectoral base, bordered narrowly with grayish-white. Another from front of spinous dorsal, likewise bordered, and parallel gray-white line from front of occiput down to gill-opening so it joins posterior marginal line of ocular bar. Rest of trunk with several less distinct parallel bands, all pale edged. Pectoral and ventral blackish, with some white lines. Length 39 to 72 mm. (caudal damaged). Two from Raraka.

It agrees largely with Günther's account and figure. P. antennata (Bloch) from the East Indies has a similar color-pattern.

Synanceja verrucosa Schneider.

Head to hind, opercle end, $2 \frac{1}{5}$; depth $2 \frac{3}{5}$; head width $2 \frac{1}{2}$; D. XIII, 6; A. III, 5; snout $3 \frac{1}{8}$ in head; measured from upper jaw tip; maxillary $2 \frac{1}{5}$; interorbital $3 \frac{1}{8}$. Head with deep interorbital concavity, another each side behind eyes, also smaller crescentic below each eye. Body generally dull umber to russet-brown in alcohol, greatly speckled, mottled or variegated with darker and lighter, or pale shades, which also extend over fins. Pectoral edge pale or whitish. Caudal similar, also with median whitish transverse band. Length 168 mm. One without locality, evidently from Polynesia?

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CARACANTHIDAE.

Caracanthus maculatus (Gray).

Head $2 \frac{1}{6}$ to $2 \frac{1}{4}$; depth $1 \frac{5}{6}$ to $1 \frac{7}{8}$; D. VII, 12 or 13; A. II, 11 or 12; P. 13 to 15; 22 to 25 pores in lateral line to caudal base; snout $3 \frac{1}{6}$ to $3 \frac{3}{4}$ in head from upper jaw tip; eye $3 \frac{7}{8}$ to 5; maxillary $1 \frac{7}{8}$ to $2 \frac{1}{3}$; interorbital $6 \frac{3}{4}$ to 7; head width 2 to $2 \frac{1}{2}$ in its total length; least depth of caudal peduncle 3 to $3 \frac{3}{4}$. Snout declivous, length $\frac{3}{4}$ to $\frac{4}{5}$ its width. Eye elevated, well before center in head length. Maxillary to hind eye edge; expansion $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in eye. Teeth in jaws in villiform bands. Interorbital convex. Rakers 4+13, lanceolate, $\frac{3}{4}$ of filaments, which $1 \frac{2}{5}$ in eye. Top of head, upper half of back below spinous dorsal finely spinescent; largest prickles on snout and top of head; body otherwise largely covered with fine papillae, more numerous and crowded about anal region. Color in alcohol fuscous, nearly uniform ground color. Top of head posteriorly and back finely and rather obscurely spotted with darker, spots little less than pupil in size. Length 28 to 55 mm. Two from Fiji and 3 from Tahiti.

The species is well figured by Waite^{155 a}

^{155 a}

Records Canterbury Mus., 1(3) 1911, 220 Pl. 45.

Cheilodactylus variegatus Valenciennes.

Head $2 \frac{7}{8}$ to $2 \frac{9}{10}$; depth $2 \frac{3}{5}$ to $2 \frac{7}{8}$; D. XVII, 29;
A. III, 9, 1, or 10; P. ii, 6 + vii or 8 + vi; scales 54 to 56
in lateral line to caudal base and 8 to 10 more on latter; tubes
about 54 in lateral line to caudal base and 1 more on latter; 7
scales above lateral line to spinous dorsal origin, 6 or 7 to
soft dorsal origin, 15 below to spinous anal origin; 30 to 32
predorsal scales; snout 3 in head; eye 5; maxillary $3 \frac{3}{5}$ to
 $3 \frac{2}{3}$; interorbital 4.

HEXAGRAMMIDAE

Hexagrammos decagrammos (Pallas). *Fig. 369 and 370.*

Head $3 \frac{1}{8}$; depth about $3 \frac{1}{8}$; D. XX, I, 20? (3 damaged?); A.I, 23, 1; scales about 114 rows close above and along median lateral line to caudal base; tubes about 109 in median lateral line to caudal base and about 30 more out over caudal from base, or about $\frac{4}{5}$ entire fin length; 16 scales above median lateral line to spinous dorsal origin, 14 to soft dorsal origin, 32 below to anal origin; about 35 scales between spinous dorsal origin and hind eye edge; snout $2 \frac{9}{10}$ in head; eye $5 \frac{3}{5}$; maxillary $4 \frac{5}{6}$; head width $1 \frac{5}{6}$. Snout conic, width $1 \frac{1}{8}$ its length. Hind eye edge midway in head length. Interorbital convex. Rakers ~~4~~12, tuberculate, low; filaments $1 \frac{1}{3}$ in eye. Scales oblong, with 15 to 28 parallel apical striae and 12 to 15 marginal striae; cheeks and opercles full covered with cycloid scales; 30 rows between eye and angle of entire preopercle; lateral line 5, though only 3 continuous to caudal-base. Color in alcohol bone brown generally, becoming more natal brown on lower surface of head and abdomen. Fins all dark. Length 335 mm. One from "Pomotous" (body skinned out) evidently with wrroneous locality, and doubtless obtained in California or Oregon.

Likewise a small example, 235 mm. (caudal damaged), labeled "Oahu"! It shows: Head 4; depth 4; D. XX, I, I, 27? (fin damaged); A. I, 23; scales 115 in median lateral line to caudal base; snout 3 in head; eye 5; maxillary $2 \frac{1}{2}$; interorbital $5 \frac{1}{2}$. In poor preservation.

Two drawings by Richard, 1 from "Pomotou" and the other without locality.

Cottidae.

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Hemilepidotus hemilepidotus (Pilesius). Fig. 372.
Drawing of an example from Puget
Sound, unsigned.

~~COTTIDAE.~~

Cottus asper Richardson. Fig. 371.

Head $2 \frac{7}{8}$ to $3 \frac{1}{10}$; depth $4 \frac{3}{5}$ to $5 \frac{1}{5}$; D. IX - 21 or
22; A. 18, 1; about 40 tubes in lateral line to caudal base; snout
 $3 \frac{2}{5}$ in head; eye 5 to $6 \frac{3}{5}$; maxillary $2 \frac{1}{5}$; interorbital 5 to

6; head width $1 \frac{1}{5}$ to $1 \frac{1}{4}$. Hind eye edge slightly advanced from center in head length. Maxillary reaches eye center. Jaws even. Teeth in broad bands in jaws, narrow bands on vomer and palatines. Interorbital slightly concave or depressed. Rakers ii or III. vi or VII, low, broad, asperous tubercles, greatly shorter than filaments, which $1 \frac{2}{3}$ to 2 in eye. Body covered with fine asperities or simple denticles, smaller behind and absent from caudal peduncle. Vent nearer caudal base than snout tip by about 2 eye-diameters. Color in alcohol largely dark brown, obscurely mottled or speckled with darker. Fins brown, bases and lower pectoral rays finely specked with darker. Length

135 to 210 mm. Two from the Columbia River, Oregon. *Painting by*
Drayton, labeled Fort Vancouver, June 1841. In note also says
Lepcoccottus armatus Girard. "This same species I caught in
424-373- small brook of the Willamette."

Head $2 \frac{3}{5}$ to $2 \frac{2}{3}$; depth 6; D. VII or VIII -18; A. I, 15; snout $3 \frac{4}{5}$ to 4 in head; eye $8 \frac{1}{10}$ to $9 \frac{1}{8}$; maxillary 2 to $2 \frac{1}{10}$; bony interorbital $5 \frac{1}{3}$ to $5 \frac{1}{2}$, slightly concave; head width $1 \frac{2}{5}$ to $1 \frac{2}{3}$. Snout length $\frac{3}{5}$ to $\frac{2}{3}$ its width. Lower jaw little shorter than upper. Preopercle with strong spine, armed with 3 spines projecting upward. Rakers 3+13 low asperous tubercles; filaments $1 \frac{1}{4}$ in eye. Color in alcohol brown above. Head more or less mottled darker. Upper lid of eye deep brown, with pale blotch. Inside gill-opening, prepectoral, postpectoral and axillary regions continued as band to caudal base, just below middle, brassy or gilt. Vertical fins dull yellowish basally, otherwise brown.

also assigned drawing from the Columbia River, Oregon.

Dorsals with 3 oblique dark brown bands longitudinally, uppermost of spinous fin blackish behind. Anal dull yellow basally, pale brown marginally. Pectoral and ventral dull brown, former with 5 transverse broad deeper brown bands. Length 265 to 270 mm. One labeled "Callao" and another "probably Pacific", doubtless from

California or Oregon? *These drawings, 1 by Dougal, labeled Penn. Also drawing, unsigned, from Puget Sound example.*
Oligocottus maculosus Girard. *Fig. 374.*

Head 3 to 3 1/2; depth 4 3/4 to 4 4/5; D. VIII - 16; A. 13; snout 3 3/4 to 4; maxillary 2 1/4 to 2 3/5; interorbital 2 to 2 1/2 in eye; head width 1 2/5 to 1 4/5 in its total length. Snout conic, length 4/5 its width. Hind eye edge advanced from center in head length midway in younger example. Maxillary about 2/3 in eye, midway in younger example. Bands of fine teeth in jaws, on vomer and palatines. Interorbital narrowly concave. Top of head and interorbital with scattered filaments and flaps. Pair of strong nasal spines pointing directly upward. Preopercle spine well developed, and one curved upward. Gill-membranes form broad free fold across isthmus. Rakers 16, broad, low, asperous tubercles; filaments 1 3/5 in eye. Lateral line complete, distinct, with about 38 pores. Front anal ray thickened and longest. Color in alcohol dull uniform brownish, little paler below. Spinous dorsal with black marginal blotch over first 2 membranes. Soft dorsal with 3 or 4 horizontal dark brown bands. Pectoral, ventral and caudal barred transversely with darker. Anal with dark brown on membranes between each ray. Length 50 to 73 mm. Three from Puget Sound.

Oligocottus borealis Jordan and Snyder was said to differ in the presence of the black spinous dorsal ocellus and the front

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anal rays of the males not especially enlarged. Our material agrees entirely with O. maculosus Girard, except in the alleged absence of the black dorsal ocellus. It thus appears O. borealis is hardly likely a valid species.

TRIGLIDAE.

Prionotus punctatus (Bloch). *Fig. 375*

Head $2 \frac{2}{3}$; depth $4 \frac{1}{3}$; D. X-12; A. II, 1; scales in 95 rows in lateral line to caudal base; tubes 50 in lateral line to caudal base and 2 more on latter; 8 scales above lateral line to soft dorsal origin; 15 rows of scales before spinous dorsal origin; snout $2 \frac{1}{10}$ in head from upper jaw tip; eye $6 \frac{3}{5}$; maxillary $2 \frac{1}{3}$; bony interorbital $7 \frac{4}{5}$. Head width $1 \frac{3}{5}$ in its total length. Interorbital concave. Rakers $3+13$, lanceolate, slightly larger than filaments or $1 \frac{2}{5}$ in eye. Scales with 4 to 6 basal radiating striae, 24 to 28 apical denticles and fine circuli. Pectoral $1 \frac{1}{3}$ to caudal base. Color in alcohol dull brownish above, lower or under surface pale to whitish. Head above entirely closely spotted with dull brown, and all spots much smaller than pupil. Fins, except ventral and anal, with brownish spots on rays or spines. Pectoral dusky brown, 5 dark blotches large as eye above, also upper rays of fin pale with intervening brown cross-bars. Length 192 mm.

One without locality, probably from Rio Janeiro. *Unsigned drawing of an example from Rio Janeiro.*

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Jordan notes²⁷³ an example recorded by Valenciennes 200 mm. long, from Bahia. Its depth is given as $2 \frac{4}{5}$.

In our example the first 3 dorsal spines are very slightly roughened, pectoral half combined head and trunk, snout with blunt lateral spines behind serrae, small spine. on cheek bone, third dorsal spine $2 \frac{1}{8}$ in head, caudal truncate and no black blotch on spinous dorsal.

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Proc. U.S. Nat. Mus., 1886, p. 544.

Chelidonichthys kumu (Lesson).

Fig. 376.

Head $3 \frac{1}{4}$; depth $5 \frac{3}{4}$; D. IX-16; A. 14; scales in 150 rows in lateral line to caudal base; tubes about 70 in lateral line to caudal base; 12 scales above lateral line to soft dorsal origin, 48 below to anal origin; 18 rows of scales before spinous dorsal origin; snout 2 in head; eye $5 \frac{1}{4}$; maxillary $2 \frac{1}{4}$; bony interorbital 6; head width $1 \frac{2}{3}$. Interorbital concave. Rakers $2 + 10$, lanceolate, slightly larger than filaments or 2 in eye. Scales cycloid, basal radiating striae 2 to 4, circuli fine. Pectoral $1 \frac{4}{5}$ to caudal base. Color in alcohol umber above, sides and below whitish, former with silvered appearance. Spinous dorsal uniform pale brown, soft dorsal and anal little darker. Anal white. Pectoral with dusky membranes, blackish inside, with lowermost and few spots white; outside, or front edges of rays all whitish. Ventral pale brownish.

Length 377 mm. One from "Oahu" though this evidently erroneous, and the specimen probably from Australia or New Zealand?

Some one has still further complicated the locality by writing 'Peru' on the manuscript drawing!

This fish is readily characterized by the very small scales and spiny scutes at bases of both dorsals. We have also compared 8 smaller examples, in poor condition, from Victoria, Australia and now in the Academy.

CEPHALACANTHIDAE.

Cephalacanthus volitans(Linnaeus).

Head $3 \frac{3}{5}$; depth $5 \frac{3}{4}$; D. II-V-8; A. 6; scales in 60 rows from gill-opening to caudal base and 3 more on latter; 22 to 24 transverse rows of scales between soft dorsal and anal origins; 7 predorsal scales; snout 3 to $3 \frac{1}{6}$ in head; eye $2 \frac{1}{2}$; maxillary 3; interorbital 2. Depressed pectoral reaches within $\frac{2}{5}$ an eye diameter of caudal base. Color in alcohol brown, body paler below. Upper surface of head speckled or mottled obscurely with darker. Spinous dorsal dusky brown. Soft dorsal with dull brown spots. Pectoral whitish medially on lower or outer surface, otherwise deep blackish-brown and some obscure blackish blotches on upper surface. Length 140 mm. Rio Janeiro.

Ebisinus cheiro^hphthalmus(Bleeker).

Head $3 \frac{1}{8}$; depth $4 \frac{1}{2}$; D. I-I-V-8; A.b; scales in 43 rows from gill-opening to caudal base and 4 more on latter; 24 transverse rows of scales between soft dorsal and anal origins; snout 3 in head; eye $2 \frac{1}{5}$; maxillary $2 \frac{1}{8}$; interorbital $1 \frac{1}{2}$; head width $1 \frac{1}{4}$ to 2. Snout obtuse, steep in young. Eye long as postorbital. Mouth small, inferior. Maxillary reaches opposite eye center. Interorbital

concave, more so in young. Width at tips of scapular spines $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in narrow angular emargination to occiput. Lateral line slopes down on side and midway along caudal peduncle.

Elongate first dorsal spine $1 \frac{1}{8}$ to $1 \frac{1}{3}$ in head, measured to end of scapular spine. Color in alcohol dull brown. Back with 4 dark brown saddles, median largest. First dorsal spine with narrow blackish membrane, other dorsal fins pale, spotted with brown. Caudal pale, with 4 or 5 cross rows of brown spots. Pectoral dark brown, spotted with darker, and rather large median dusky blotch. Head above with irregular dark brown spots and blotches. Length 65 to 107? mm. Two from S. Lat. 28° N. Long. 45° .

This species well figured by Jordan and Richardson²⁷⁴

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Proc. U. S. Nat. Mus., vol. 33, 1908, p. 665, fig. 8.

EMBIOTOCIDAE

Cymatogaster aggregatus (Gibbons).

Head $3 \frac{1}{8}$; depth $2 \frac{3}{4}$; D. X, 21, 1; A. III, 25, 1; scales 41 in lateral line to caudal base; 5 scales above lateral line to spinous dorsal origin; 3 to soft dorsal origin, 12 below to spinous anal origin; 13 predorsal scales; snout $3 \frac{4}{5}$ in head; eye $3 \frac{4}{5}$; maxillary 4; inter-bital $3 \frac{3}{4}$.

Body elongately ovoid, compressed; least depth of caudal peduncle equals its length or $2 \frac{1}{2}$ in head. Head width $2 \frac{1}{8}$ its length. Snout broad as long. Eye little elevated, center about first $\frac{2}{5}$ in head. Maxillary not quite to eye; expansion $2 \frac{3}{4}$ in eye. Teeth simple, slightly curved, uniserial in jaws. Nostrils(damaged) close before eye. Interorbital convex. Preopercle edge entire. Rakers 10 18, lanceolate, $1 \frac{1}{4}$ in filaments and latter $1 \frac{3}{4}$ in eye. Scales cycloid, in even rows parallel with lateral line above its course and in horizontal rows below; scales smaller along body edges, especially on predorsal and breast and chest, scaly basal sheaths along dorsals and anals; caudal base scaly; 4 rows of cheek scales; basal marginal striae 10 to 12; coarse circuli few; lateral line well arched, little closer to dorsal profile behind, slopes till median at caudal base; simple tubes rather well exposed. Fifth dorsal spine $2 \frac{1}{3}$ in head; first dorsal ray $2 \frac{7}{8}$; third anal spine 6; second anal ray $3 \frac{2}{5}$; pectoral $1 \frac{1}{6}$; ventral $1 \frac{7}{8}$.

Color in alcohol back brown with dull gray tinge. Sides and lower surface pale to whitish. Fins pale brownish. Iris pale brassy-brown. Cluster of brown dots on exposure of each scale, form longitudinal bands. Length 107 mm. (caudal damaged). One without locality, doubtless from San Francisco?

Hyperprosopon argenteus (Gibbons).

Head $3 \frac{1}{8}$?; depth $2 \frac{1}{5}$?; D. VIII, 27; A. III, 32; body strongly compressed; snout $1 \frac{1}{3}$ in eye; eye $2 \frac{3}{4}$ in head; median dorsal spines highest, little longer than soft rays; pectoral reaches front anal ray bases; ventral inserted close behind pectoral base. Rakers $8+18$, lanceolate, about 2 in eye; filaments $\frac{4}{5}$ of rakers. Scales with 8 to 12 basal marginal striae; circuli rather coarse. In alcohol back slaty. Sides and lower surface silvery-white, also sides of head; fins all dull brown. Length 76 mm. (caudal damaged). One in very poor condition from San Francisco, Cal.

Hyperprosopon agassizii Gill.

Head $2 \frac{7}{8}$ to 3; depth $2 \frac{1}{5}$ to $2 \frac{1}{3}$; D. X, 23, 1; A. III, 29, 1; scales about 68 to 70? in lateral line to caudal base; 10 to 12 scales above lateral line to spinous dorsal origin, 22 to 24 below to spinous anal origin; 30 to 33 predorsal scales; snout $3 \frac{1}{2}$ to $3 \frac{2}{3}$ in head; eye $3 \frac{1}{8}$ to $3 \frac{2}{5}$; maxillary 3 to $3 \frac{1}{10}$; interorbital 4.

Body moderately ellipsoid, compressed; least depth of caudal peduncle long as deep or $2 \frac{1}{8}$ to $2 \frac{1}{6}$ in head. Head width $2 \frac{1}{3}$ to $2 \frac{1}{2}$ its length. Snout about long as wide. Eye center about first $\frac{2}{5}$ in head. Mouth small, jaws about even. Maxillary to eye; expansion about $2 \frac{2}{3}$ to $2 \frac{3}{4}$ in eye. Teeth few, small, conic, simple, apparently uniserial (damaged) or only clearly biserial in front. Lips moderate, smooth. Nostrils together, front one at last third in snout. Interorbital broadly convex. Hind preopercle edge entire. Rakers 8+19, lanceolate; nearly long as filaments, which $2 \frac{1}{8}$ in eye. Scales cycloid, rows above lateral line parallel, below lateral line horizontal; basal scaly sheath along dorsals and anals; caudal base finely scaled; small scales on breast; 6 rows of cheek scales; basal radiating striae 5 to 7; circuli 15 to 19; lateral line concurrent with dorsal profile, slopes until median at caudal base; tubes simple, each little exposed. Seventh dorsal spine $2 \frac{1}{2}$ to $2 \frac{3}{5}$ in head; twentieth dorsal ray $1 \frac{1}{4}$; twenty-seventh anal ray $1 \frac{1}{2}$; pectoral $1 \frac{1}{5}$ to $1 \frac{1}{3}$; ventral $1 \frac{7}{8}$ to $2 \frac{1}{4}$.

Color in alcohol brownish on back and top of head. Sides below and under surface paler or with whitish tint. Fins dull yellowish. Ventral with terminal dusky dots. Length 77 to 80 mm. Three from San Francisco.

Amphistichus argenteus Agassiz:

Head $3 \frac{1}{6}$; depth $2 \frac{1}{3}$; D. X, 24; A. III, 27; scales 57 in lateral line to caudal base and 4 more on latter; 9 scales above lateral line to spinous dorsal origin, 8 to soft dorsal origin, 19 below to spinous anal origin; 22 predorsal scales to occiput; snout $4 \frac{1}{8}$ in head; eye $3 \frac{4}{5}$; maxillary $2 \frac{3}{4}$; interorbital 4.

Body ovoid, compressed, back elevated; least depth of caudal peduncle equals its length or $2 \frac{1}{2}$ in head. Head width $1 \frac{7}{8}$ its length. Snout length about $\frac{2}{3}$ its width. Eye elevated, hind edge midway in head; little longer than snout; Mouth moderate, lower jaw included. Maxillary to eye at least; expansion 2 in eye. Lower lip with broad frenum. Teeth simple, conic, biserial above and below forward, those in outer row little longer. Nostrils together, close, before eye, hind one larger. Interorbital broadly convex. Preopercle entire. Rakers $6+11$, iii, lanceolate, about $\frac{3}{4}$ of filaments, which $1 \frac{1}{2}$ in eye. Scales adherent, in rows above lateral line parallel, below in horizontal rows; bases of spinous dorsal and anal, front of soft anal and caudal base, with small scales; 6 rows of cheek scales to preopercle angle; small scales along body edges; 9 or 10 basal marginal striae; circuli moderate, about 27; lateral line concurrent with dorsal profile, slopes until median at caudal base; simple tubes small. Sixth dorsal,

spine $2 \frac{1}{8}$ in head; third anal spine $3 \frac{3}{4}$; pectoral $1 \frac{1}{8}$?; ventral $1 \frac{2}{3}$.

Color in alcohol back dull brown, sides and below largely silvery-white. Fins all dull brown. Length 163 mm. (caudal damaged). One from San Francisco.

Embiotoca jacksoni Agassiz.

Head 3; depth $1 \frac{9}{10}$; D. X, 19; A. III, 24; scales 49 in lateral line to caudal base and 4 more on latter; 8 scales above lateral line to spinous dorsal origin, 8 to soft dorsal origin; 20 below to spinous anal origin; 23 predorsal scales; snout $3 \frac{1}{3}$ in head; eye $3 \frac{2}{5}$; maxillary $3 \frac{2}{5}$; interorbital $3 \frac{2}{3}$.

Body deeply ellipsoid, compressed; least depth of caudal peduncle equals its length or half of head. Head width half its length. Snout conic, long as wide. Eye little elevated, hind pupil edge about midway in head. Mouth small, lower jaw slightly included. maxillary to hind nostril; expansion $2 \frac{1}{2}$ in eye. Teeth uniserial, conic, in jaws only. Lips thick, rather broad, edges papillose. Nostrils together, front one at last fifth in snout. Interorbital broadly convex. Preopercle edge entire. Rakers $8+13$, lanceolate half of filaments and latter $1 \frac{2}{3}$ in eye. Scales cycloid, rows above lateral line parallel, below horizontal; basal scaly sheath along dorsals and anals; caudal base finely scaled; 4 rows of cheek scales; basal radiating striae 7 or 8; circuli about 82

to 98; lateral line concurrent with dorsal profile, slopes till median at caudal base; simple tubes little exposed. Eighth dorsal spine $2\frac{1}{4}$ in head. First dorsal ray $1\frac{2}{3}$; third anal spine $4\frac{2}{3}$; first anal ray $2\frac{1}{5}$; small caudal (damaged) apparently emarginate; pectoral $1\frac{1}{10}$; ventral $1\frac{2}{5}$.

Color in alcohol umber-brown on back, below paler. Fins all dull umber, outer portions of ventral dull dusky. Length 145 mm. (caudal damaged). One from San Francisco.

Taeniotoca lateralis (Agassiz).

Painting of example without data.

Pomacentridae.

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Pomacentrus fuscus Cuvier. Fig. 208

Drawing of an example by Richard,
from Rio Janeiro.

Aplodactylidae.

Aplodactylus punctatus Valenciennes, ^{fig.}
drawing by J. H. Richard of an example
from Talparaíso.

~~POMACENTRUS~~

Pomacentrus jenkinsi Jordan and Evermann, *Fig. 209.*

Head $3\frac{1}{4}$ to $3\frac{1}{3}$; depth $1\frac{4}{5}$ to $1\frac{7}{8}$; D. XIII, 16;

A. II, 13; scales 20 in upper arch of lateral line; pores 6 to 8 in straight section; 3 or 4 scales above upper arch to spinous dorsal origin; 3 to soft dorsal origin, 12 to 13 below to spinous anal origin; 23 to 30 predorsal scales; snout 3 to $3\frac{1}{2}$ in head; eye 3 to $3\frac{3}{4}$; maxillary 3 to 4; interbital $2\frac{3}{4}$ to 3.

Body rather deeply ovoid, compressed; caudal peduncle length $\frac{1}{2}$ ~~length~~ $\frac{1}{2}$ to $\frac{3}{5}$ its least depth, latter $1\frac{4}{5}$ to $1\frac{7}{8}$ in head. Head width $1\frac{2}{5}$ to $1\frac{1}{2}$ its length. Snout convex, length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Eye elevated, hind edge midway in head. Mouth small, jaws about even. Maxillary to eye; expansion $2\frac{1}{4}$ to $2\frac{2}{3}$ in eye. Teeth uniserial, incisors, uniform. Lips narrow. Nostril at last $\frac{2}{5}$ in snout. Interorbital convex. Hind preopercle and infraorbital edges serrated roughly; opercle with 2 short spines.

Rakers 5+10, lanceolate, half of filaments and latter $1\frac{2}{5}$ in eye. Scales in longitudinal rows., upper parallel with lateral line, converge behind; muzzle with only narrow edge of snout and all of lips naked; 2 or 3 rows of infraorbital scales, and 3 more rows below on cheek; basal radiating striae 7 or 8; apical denticles 100 to 104; circuli very fine; lateral line little more arched than dorsal profile; simple tubes moderate,

last 4 or 5 scales from caudal peduncle. Fifth dorsal spine $1 \frac{7}{8}$ to 2 in head; last $1 \frac{3}{4}$ to 2; seventh dorsal ray $1 \frac{2}{5}$ to $1 \frac{1}{2}$; second anal spine $1 \frac{7}{8}$; fifth anal ray $1 \frac{1}{2}$ to $1 \frac{3}{5}$; caudal well forked, upper lobe 1 to $1 \frac{1}{8}$; pectoral $1 \frac{7}{8}$; ventral 1 to $1 \frac{1}{8}$.

Color in alcohol largely uniform umber-brown, some examples burnt umber. Each scale on trunk appears with dark submarginal streak. Small blackish spot at pectoral axil, nearly large as pupil in large examples. Dorsal, caudal and pectoral dull brown. Ventral and anal with dusky terminally. Iris pale brown. Length 85 to 120 mm. One without exact locality, likely from Maui? We have also examined 3 examples in the Academy, one a paratype and the others identified by Fowler with P. nigricans. All are included above.

Upon a comparison with a series of Samoan examples, of all ages, of P. nigricans (Lacépède), in the Academy, we find a large blackish blotch at the bases of the last dorsal rays about size of pupil, present in every example and also showing on both sides of the fin. It would therefore appear a good character for distinction, though the original describers of P. jenkinsi failed to point out differences for their Hawaiian fish, which had for all previous time been identified with the Holocentrus nigricans Lacépède.

Pomacentrus albofasciatus Schlegel.

Head $2\frac{1}{2}$ to 3; depth 2 to $2\frac{1}{5}$; D. XII, once XI, 15, often 16, seldom 13, 14 or 17; A. II, 12, often 13, rarely 14; scales 19 or 20 in upper arch of lateral line; pores 8 or 9 in straight section; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin; 9 below to spinous anal origin; 25 to 27 predorsal scales; snout 3 to $3\frac{1}{4}$ in head; eye 3 to $3\frac{1}{5}$; maxillary $3\frac{1}{3}$ to $3\frac{1}{2}$; interorbital $3\frac{1}{4}$ to $3\frac{1}{2}$.

Body elongately ovoid, compressed, front profile rather steep; caudal peduncle length $1\frac{2}{3}$ to 2 in last depth, latter 2 to $2\frac{1}{8}$ in head. Head width $1\frac{2}{3}$ to $1\frac{4}{5}$ its length. Snout conic, length $\frac{3}{4}$ to $\frac{5}{6}$ its width. Eye elevated, hind edge midway to little backward in head length. Mouth moderate, cleft horizontal, jaws about even. Maxillary to eye or pupil; expansion 2 to 3 in eye. Teeth uniserial, compressed incisors in jaws; inside upper teeth in vomerine region on front face of inner buccal fold cluster of small papillae about half size of pupil. Nostril small pore about last third in snout. Interorbital broadly convex. Hind pre-orbital and preopercle edges coarsely denticulate.

Rakers $10+12$, lanceolate, $1\frac{1}{2}$ in filaments, which $1\frac{7}{8}$ in eye. Scales in longitudinal rows, upper parallel with lateral line, all converge behind; small scales over fins basally; muzzle, including maxillary, lips and preorbital, naked to nostrils; rows of scales on suborbitals and 3 rows on cheek

below to preopercle ridge; basal radiating striae 7 to 9; apucal denticles 80 to 82; circuli fine; lateral line little more arched than dorsal profile, tubes simple and rather large, and 4 scales behind last to caudal peduncle. Fourth dorsal spine 2 to $2 \frac{1}{8}$ in head; last spine $1 \frac{7}{8}$ to $2 \frac{2}{5}$; sixth dorsal ray $1 \frac{2}{5}$ to $1 \frac{3}{5}$; second anal spine $1 \frac{1}{2}$ to 2; first anal ray $1 \frac{1}{2}$ to $1 \frac{3}{4}$; caudal very nearly or quite long as head, forked, lobes slender and pointed; pectoral $1 \frac{1}{10}$ to $1 \frac{1}{6}$; ventral 1 to $1 \frac{1}{10}$.

Color in alcohol dull brownish generally, paler below. From last dorsal spines broad whitish band, from 4 or 5 scales in width to nearly twice as many, extends down to anal and at least over front part of latter. Whole pattern may show only band of 4 scales width, but always posterior. Fins dull or pale, ventral darker on outer surface. On back behind last half of soft dorsal blotch about size of eye, front half or edge pale yellowish to whitish and hind half blackish, which variably on last dorsal rays basally. Often soft with black spot on bases of last rays and dusky streaks outside submarginally sometimes or same may occur on soft dorsal. Length 35 to 87 mm. One without definite locality, probably from Samoa or Fiji? We have also examined and include above a Samoan series of all ages in the Academy.

The Wilkes example varies chiefly in its nearly uniform brown body, without the pale band found on so many specimens; very faint traces of pale blotches on lower side of the head; very pronounced white blotch before blackish one at bases of the last dorsal rays. This latter is the chief character for P. ellipticus Jordan and Seale¹⁸², which thus appears synonymous. Our series of specimens show not only variation in this respect, but also the disappearance of the broad pale vertical band or even partial obliteration of the black axillary and blotches at last dorsal rays basally.

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Bull. Bur. Fisher., vol. 25, 1905(1906), p. 282, fig. 50.

Pomacentrus lividus (Schneider). *Fig. 210.*

Head $2 \frac{4}{5}$ to 3; depth 2; D. XII, 15 to 17; A. II, 13 or 14; scales 16 to 19 in upper arch of lateral line; pores 4 to 8 in straight section; 3 scales above lateral line to spinous dorsal origin, 2 above soft to dorsal origin, 9 or 10 below to spinous anal origin; 19 or 20 predorsal scales; snout $2 \frac{3}{5}$ to $3 \frac{1}{5}$ in head; eye 3 to $3 \frac{4}{5}$; maxillary 3 to $3 \frac{1}{8}$; interorbital $2 \frac{4}{5}$ to 3.

Body elongately ovoid, back elevated, compressed, front profile steep; caudal peduncle length $\frac{3}{5}$ to $\frac{2}{3}$ its least depth, which 2 to $2 \frac{1}{8}$ in head. Head width $1 \frac{2}{3}$ to $1 \frac{7}{8}$ its length. Snout with slight depression in front profile,

length $3/4$ to $4/5$ its width. Eye elevated, hind edge about midway in head length. Mouth moderate, jaws about equal. Maxillary to eye or pupil; expansion $1\frac{4}{5}$ to 2 in eye. Teeth uniserial, uniform even incisors, ends scarcely notched. Lips rather thin. Nostrils about last $2/5$ in snout. Interorbital convex. Hind preopercle and preorbital edges denticulated; hind opercle edge with 1 or 2 short spines.

Rakers $11+16$, lanceolate, $1\frac{1}{2}$ in filaments, which $1\frac{1}{3}$ in eye. Scales in longitudinal rows, upper parallel with lateral line, all converge behind; small scales over bases of fins; muzzle before nostril; 3 rows of scales on preorbital below eye and 3 more rows on cheek below preorbital; basal radiating striae 4 to 6; apical denticles 88 to 90; circuli fine; lateral line little more arched than dorsal profile, simple tubes rather large and 5 scales behind last to caudal peduncle. Fourth dorsal spine $2\frac{2}{5}$ to $2\frac{1}{2}$ in head; twelfth spine $1\frac{3}{5}$ to $1\frac{7}{8}$; sixth dorsal ray $1\frac{1}{6}$ to $1\frac{1}{2}$; second anal spine $1\frac{4}{5}$ to 2; sixth anal ray $1\frac{1}{5}$ to $1\frac{1}{3}$; caudal emarginate, upper lobe 1 to $1\frac{1}{3}$; pectoral $1\frac{1}{8}$ to $1\frac{1}{5}$; ventral reaches vent; which close before anal, $1\frac{1}{10}$ to $1\frac{1}{6}$.

Color in alcohol dull sepia generally, lower sides and under surface slightly paler. Head specked or blotched irregularly with paler, spots small on top and larger on lower cheeks and

opercles. Traces of small spots, usually one on each scale, on trunk. Fins dull uniform brown. Axilla dull brown, sometimes with one or several pale spots. Length 30 to 107 mm. Five without exact locality, though likely Polynesian,

and 2 from Samoa. *The drawings by Richard are from one example from Samoa and 2 from Fiji.*

Only two of the Wilkes examples show a dark blotch at the bases of the last dorsal rays, in size about as large as pupil. Compared with a series of Samoan examples in the Academy and found to agree in every respect. Some of these Samoan examples show other dark blotches of about same size, in fact hind dorsal one mostly absent. Sometimes 2 dark blotches may occur about the humeral region or a dark spot may be noticed near the pectoral, supraanal etc. They are seldom symmetrical on both sides of the body and usually absent ^{from} one side.

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Pomacentrus trilineatus Cuvier. Fig. 211.
Drawing of an example from Samoa
by J. H. Richard.

Abudefduf imparipennis (Vaillant and Sauvage). Fig.

Head $3 \frac{1}{10}$; depth $2 \frac{1}{5}$; D. XII, 14; A. II, 11; P. i, 18; V. I, 5; scales 20 in upper arch of lateral line and 3 behind last tube to caudal peduncle; pores in straight section of lateral line, not evident, but 8 scales counted from opposite last tube of upper arch to caudal base midway along caudal peduncle side; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 9 below to spinous anal origin; 24 predorsal scales; head width $1 \frac{2}{3}$ its length; snout $3 \frac{2}{5}$; eye 3; maxillary $3 \frac{1}{4}$; interorbital $3 \frac{1}{4}$; third dorsal spine 2; last 3; fifth dorsal ray $1 \frac{1}{2}$; second anal $1 \frac{3}{4}$; third anal ray $1 \frac{1}{2}$; pectoral $1 \frac{1}{5}$; ventral $1 \frac{1}{10}$; least depth of caudal peduncle 2.

Body elongately ovoid, deepest at dorsal origin, back elevated, compressed, edges not trenchant. Caudal peduncle compressed, length $3/4$ its least depth.

Head moderate, well compressed, surfaces converging equally above and below, profiles similar. Snout convex over surface and in profile, length $3/4$ its width. Eye large, elevated, hind pupil edge about midway in head length. Mouth small, jaws about even. Maxillary extends slightly beyond front eye edge, though not to pupil, and slips below narrow preorbital; expansion about equals pupil. Lips rather fleshy, though not very wide. Teeth small, compressed, ends rather convex, not truncate. Nostril at last fourth of snout in profile. Interorbital broad, slightly convex. Greatest preorbital width about half of eye, and edge, together with narrow suborbitals, entire; preopercle inclined forward, edge entire; opercle with 2 broad spines, lower little larger.

Gill-opening extends forwards opposite front eye edge. Rakers $2 + 6$, lanceolate, about $3/5$ of filaments, which $1 \frac{2}{3}$ in eye. Pseudobranchiae little shorter than filaments. Isthmus broadly triangular.

Scales in longitudinal rows, upper parallel with lateral line, others horizontal and those continuous to caudal peduncle slightly converge behind; breast scales moderate, predorsal little smaller and become quite small on interorbital; row of

scales on infraorbitals and 3 rows on cheek to preopercle ridge, also few scales scattered along flange; snout naked to nostrils, also lips, preorbital and maxillary; humeral scales large; fins, except ventrals, all covered with small scales basally, extending well out over rayed vertical portions; scales rough to touch; basal radiating striae 5 to 10; apical denticles 44 to 80; circuli fine; upper arch of lateral line of large simple tubes, course little more arched in front than profile of back.

Dorsal spines all rather robust, first spine $1/3$ longer than last and third longest; fin edge notched and with slight cutaneous flaps behind tip of each spine. Soft dorsal inserted opposite seventeenth tube of lateral line; fin rounded, depressed back reaches caudal base and fifth ray apparently longest. Anal spines strong, second when depressed reaches well beyond base of last ray. Soft anal rounded, when depressed not quite reaching caudal base. Caudal at least $2/3$ of head (damaged). Pectoral broad, not quite to vent, which close before anal. Ventral reaches anal, spine about $2/3$ of fin.

Color in alcohol dull brownish, pale below, largely uniform or without markings. Iris pale brown, except dark brown blotch above equally large as pupil. Length 54 mm.

One from Maui. Richard's drawing says simply Sandwich Islands.

This example agrees in most details with the original account of Glyphisodon imparipennis Vaillant and Sauvage. Their description varies, however, in giving 16 soft dorsal rays and scales on snout nearly extending to front edges. Perhaps the most striking character is the statement that the second anal spine is longer than the soft rays. This is wrongly translated as "second dorsal spine as long as soft rays" by Jordan and Evermann¹⁸³, thus rendering the most salient specific character misleading. These writers further incorrectly give 2 scales above the lateral line though Vaillant and Sauvage mention 3.

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Bull. U.S. Fish Com., vol. 23, pt. 1, 1903(1905), p. 274.

Abudefduf uniocellatus (Quoy and Gaimard).

Head 3; depth $2 \frac{2}{5}$; D. XIII, 12; A. II, 11; 16 tubes in upper arch of lateral line, and 8 pores in horizontal section; 3 scales above lateral line to spinous dorsal origin, 2 above to soft dorsal origin, 10 below to spinous anal origin; 16 predorsal scales; snout $3 \frac{1}{6}$ in head; eye $2 \frac{1}{2}$; maxillary 3; interorbital 3.

Body elongately ovoid, compressed; caudal peduncle length about $\frac{7}{8}$ its least depth, which half of head. Head width 2. Snout length about $\frac{3}{4}$ its width. Eye elevated, close to upper profile, hind edge little behind

center in head length. Mouth small, closed jaws about even. Maxillary little beyond front eye edge, though not to pupil; expansion about half of pupil. Teeth uniserial, compressed, ends little rounded. Lips rather narrow. Nostrils obscure pore about last fourth in snout. Interorbital convex. Preorbital narrow, edge and that of preopercle entire; opercle ends in 2 broad spines.

Rakers 3+8, lanceolate, long as filaments or half of eye. Scales in longitudinal rows, upper parallel with lateral line, converge little behind; muzzle including first third of interorbital; preorbital and suborbitals, naked; 2 rows of large scales on cheek to preopercle ridge; fin bases scaly; basal radiating striae 7 or 8; apical denticles 25 to 45; circuli fine; lateral line little more arched than dorsal profile, 6 scales behind last tube to caudal peduncle. Second dorsal spine $2\frac{1}{4}$ in head; second anal spine $2\frac{1}{4}$; pectoral $1\frac{1}{3}$; ventral $1\frac{1}{5}$.

Color in alcohol with back pale bluish, tinged with olive. Base of each scale with darker vertical blotch. Blackish line from side of snout, below nostril to anal through eye upwards ends in small black spot on suprascapula. Another blackish line from middle from middle of maxillary to lower eye edge across opercle as 2 broken sections to end as small blackish spot at pectoral axilla, but not on

pectoral fin base. Blackish blotch, smaller than pupil, at bases of last dorsal rays. Fins all pale brownish. Median deep brownish band from front of interorbital to spinous dorsal. Head largely bluish above, pale brownish below with bluish blotches. Length 32 mm (caudal largely broken). One labeled "Oahu", though likely from Fiji.

A young example, without locality, shows: Head $2 \frac{4}{5}$; depth $2 \frac{2}{5}$; D. XIII, 17; A. II, 12?; scales mostly fallen, large; snout 4 in head; edge $2 \frac{4}{5}$; maxillary 3; interorbital $3 \frac{1}{4}$; length 32 mm. (caudal broken).

Abudefduf zonatus (Cuvier). *Fig. 213.*

Head $3 \frac{1}{8}$ to $3 \frac{1}{3}$; depth $2 \frac{1}{5}$ to $2 \frac{2}{5}$; D. XIII, 12 or 13;; A. II, 13; 17 or 18 tubes in upper arch of lateral line, and 5 to 7 pores in horizontal section; 3 scales above lateral line to spinous dorsal origin, 2 above to soft dorsal origin; 10 below to spinous anal origin; 15 to 18 predorsal scales; snout 3 to $3 \frac{2}{4}$ in head; eye 3 to $3 \frac{1}{2}$; maxillary 3 to $3 \frac{2}{5}$; interorbital 3 to $3 \frac{2}{4}$.

Body elongately ovoid, back elevated, compressed, front profile rather steep; caudal peduncle length $1 \frac{1}{4}$ to $1 \frac{2}{3}$ its least depth and latter $1 \frac{4}{5}$ to $2 \frac{1}{10}$ in head. Head width $1 \frac{3}{4}$ to 2 in its length. Snout conic, length $\frac{3}{4}$ to $\frac{4}{5}$ its width; Eye rather high, hind edge midway in head, hind pupil edge midway in small example. Mouth rather small, horizontal, jaws even. Maxillary nearly or quite to eye, or even slightly beyond front edge; expansion $2 \frac{1}{4}$ to 3 in eye. Teeth uniserial, compressed, rather

pointed ends bifid or trifid, outer cusps small. Nostril small pore at last third or $2/5$ in snout. Interorbital convex. Preorbital and preopercle edges entire; opercle ends in 2 short flat spines.

Rakers 7 or 8+13 to 15, lanceolate, $1 \frac{1}{6}$ in filaments, which $1 \frac{1}{3}$ to $1 \frac{3}{4}$ in eye. Scales in longitudinal rows, upper parallel with lateral line; most converge behind; small scales over fins basally; muzzle, lips, maxillary and preorbital naked to front of eye; 1 or 2 rows of small scales on suborbitals, and 3 more rows on cheek below to preopercle ridge; basal radiating striae 10 or 11; apical denticles 60 to 95; circuli very fine; lateral line little more arched than dorsal profile, simple tubes large and well exposed, 3 to 5 behind last to caudal peduncle. Fourth dorsal spine $2 \frac{1}{8}$ to $2 \frac{1}{4}$ in head; last dorsal spine $1 \frac{3}{5}$ to $1 \frac{7}{8}$; seventh dorsal ray $1 \frac{1}{5}$ to $1 \frac{2}{5}$; second anal spine $1 \frac{2}{3}$ to 2; eighth anal ray $1 \frac{1}{5}$ to $1 \frac{1}{4}$; upper caudal lobe 1, fine emarginate behind; pectoral 1 to $1 \frac{1}{10}$; ventral 1 to $1 \frac{1}{8}$.

Color in alcohol dull uniform brownish. Outer portions of fins rather pale. On back above, opposite pectoral medially vertical pale band down until level with pectoral origin and about 3 or 4 scales in width. Iris dull slaty brown. One example differs in the absence of the pale vertical band above outer pectoral end. Its color largely

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uniform. Length 68 to 90 mm. One from Fiji, and 3 others

probably from Samoa or Fiji? *Drawings of 2 from Fiji and 1 from Samoa by J. H. Richard.*

We have also examined 2 Samoan examples in the Academy, 65 to 70 mm. long. As preserved in alcohol they have several longitudinal streaks on the side, one along middle of each row of scales.

Abudefduf amabilis (De Vis). *Fig. 214.*

Head 3 to $3 \frac{1}{3}$; depth $2 \frac{1}{3}$ to $2 \frac{2}{3}$; D. XII or XIII, 12 or 13; A. II, 12; 18 or 19 tubes in upper arch of lateral line (last scales fallen?), and 6 to 8 pores in horizontal section; 3 scales above lateral line to spinous dorsal origin, 1 or 2 above to soft dorsal origin; 20 or 21 predorsal scales; snout $3 \frac{1}{3}$ to $3 \frac{3}{4}$ in head; eye $2 \frac{2}{3}$ to $3 \frac{1}{4}$; maxillary, $2 \frac{2}{3}$ to $2 \frac{4}{5}$; interorbital $3 \frac{1}{4}$ to $3 \frac{4}{5}$.

Body elongately ovoid, back not elevated, compressed, upper front profile little more convex; caudal peduncle length $\frac{3}{5}$ to $\frac{4}{5}$ its least depth, latter $1 \frac{4}{5}$ to 2 in head. Head width $1 \frac{1}{2}$ to $1 \frac{7}{8}$ its length. Snout conic, length $\frac{2}{3}$ its width. Eye little elevated, hind edge midway in head, hind pupil edge midway in half grown. Mouth small, terminal, jaws even. Maxillary to eye, to pupil in half grown; expansion $2 \frac{1}{2}$ to 3 in eye. Teeth uniserial, incisor-like, upper at least ^{largely} bifid. Nostril about last third in snout. Interorbital convex. Preorbital and preopercle edges entire.

Rakers about $5 + 12$, lanceolate, $2/3$ of filaments and latter half of eye. Scales in longitudinal rows, upper parallel with lateral line, all converge behind; small scales over fins basally; muzzle, lips, maxillary and preorbital naked to front nostril; row of scales on suborbital, and 3 rows on cheek below to preopercle ridge; basal radiating striae 7 to 9; apical denticles 55 to 66; circuli very fine; lateral line little more inclined in front than dorsal profile; simple tubes large, well exposed. Fourth dorsal spine 2 to $2 \frac{1}{6}$ in head; last $1 \frac{3}{4}$ to $1 \frac{7}{8}$; fifth dorsal ray $1 \frac{1}{3}$ to $1 \frac{2}{5}$; second anal spine $1 \frac{1}{2}$ to $1 \frac{3}{4}$; seventh anal ray $1 \frac{1}{5}$ to $1 \frac{1}{4}$; caudal little emarginate, 1 to $1 \frac{1}{8}$; pectoral 1 to $1 \frac{1}{8}$; ventral 1.

Color in alcohol dusky-brown generally. Broad whitish vertical band on opercle. Broad white band on trunk 3 scales wide crosses lateral line at seventh scale and slopes backward until reaching just before anal. White band crosses caudal peduncle, 3 scales wide. Fins mostly brownish, ventral black. Caudal blackish basally, outer portions dusky-gray, like those of rayed dorsal and anal. Iris slaty. Length 51 to 60 mm. Two without definite locality, ~~likely from Fiji or Samoa?~~ *Drawings of 2 from Fiji by Richard.*

We also include a series of Samoan examples in the Academy 40 to 70 mm. long. In the fresher material the general color is blackish-brown and white vertical bands very distinct and contrasted.

Abudefduf leucopomus (Cuvier). Fig. 215.

Figure by J. W. Drayton from
Tahiti example, September 1839. Also
3 drawings of young from Fiji by
J. H. Richard.

Abudefduf dicksi (Léonard). Fig. 216.
Drawing of an example from Fiji
by J. H. Richard.

Abudefduf mauritii (Bloch). Fig. 217.
Drawing of an example from Rio
Janeiro by Richard.

Abudefduf saxatilis (Linnaeus). Fig. 218.
Drawings of one from Samoa, one young
from Fiji and 1 wrongly labeled "Oahu"
by J. H. Richard.

Abudefduf mauritanicus

Abudefduf abdominalis (Cuvier). *Fig. 219.*

Head $3 \frac{1}{10}$ to $3 \frac{2}{5}$; young $2 \frac{3}{4}$; depth $1 \frac{3}{4}$ to $1 \frac{7}{8}$; D. XIII, 14, sometimes 13 or 15; A. II, 13, sometimes 12 or 14; 20 to 23 tubes in upper arch of lateral line, and 7 to 10 pores in horizontal section to caudal base; 5 or 6 scales above lateral line to spinous dorsal origin, 4 to soft dorsal origin, 10 to 12 below to spinous anal origin; 25 to 27 predorsal scales; snout $3 \frac{1}{5}$ to 4 in head from upper jaw tip, $4 \frac{1}{6}$ in young; eye 3 to 4, young $2 \frac{2}{5}$; maxillary 3 to $3 \frac{1}{2}$; interorbital $2 \frac{2}{5}$ to $3 \frac{1}{8}$.

Body deeply ovoid, more so in young, strongly compressed; caudal peduncle length about $\frac{3}{5}$ to $\frac{2}{3}$ its least depth, latter $1 \frac{3}{4}$ to $2 \frac{1}{4}$ in total head length. Head width $1 \frac{3}{5}$ to 2. Snout convex, length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Eye with hind edge about midway in head, hind pupil edge midway in young. Mouth small, lower jaw slightly protrudes, more so in young. Maxillary to hind nostril, little beyond front eye edge though not to pupil in young; expansion 2 in eye, 3 in young. Teeth uniserial even incisors, edges only very slightly notched or emarginate. Lips broad. Nostril about last fourth in snout profile. Interorbital convex. Preopercle and preorbital edges entire.

Rakere 8+17 to 23, lanceolate, $1 \frac{2}{5}$ in filaments or 2 in eye. Scales in rows parallel with lateral line, converge behind; scales all small along body edges, and still smaller extending out on fins basally; caudal almost entirely covered with minute scales, and those in soft dorsal and anal extend far over fins; opercle with several large scales; preorbital with fin scales (mostly fallen) and 3 rows on cheek, also another row apparently on flange(fallen); young with only 2 rows of cheek scales; scales with basal radiating striae 10 or 11; apical denticles 154 to 163, in young about 45; circuli extremely fine; forward scales in lateral line with short branches above and below, others mostly simple tubes, last ending below soft dorsal 3 scales from caudal peduncle. Fourth dorsal spine $1 \frac{5}{6}$ to $2 \frac{1}{6}$ in head; fifth dorsal ray, 1 to $1 \frac{2}{5}$; second anal spine $1 \frac{3}{4}$ to $2 \frac{1}{4}$; sixth anal ray $1 \frac{1}{6}$ to $1 \frac{3}{4}$; upper caudal lobe $1 \frac{1}{5}$ to $1 \frac{1}{3}$, sometimes much longer than lower lobe, fin deeply forked; pectoral $1 \frac{1}{5}$ to $1 \frac{1}{5}$; ventral reaches anal, $1 \frac{1}{8}$ to $1 \frac{1}{8}$.

Color in alcohol faded deep brownish generally, lower surfaces scarcely paler. Four broad vertical dark bands, little over 3 scales in width or equally wide as intervening pale areas; first on predorsal region down to pectoral origin, second from front dorsal spines, third from median spines and fourth from last spines; also reflection of fifth band as

obscure saddle on upper caudal peduncle from last dorsal rays; dark bands all reflected on dorsal fin bases and fins otherwise all deep brownish; blackish axillary pectoral blotch forward. Length 27 to 185 mm. Eleven examples, of which 4 labeled Oahu, and the others without definite locality probably from Maui? *Three drawings by Richard, of which 1 labeled Maui and 1 young labeled Oahu.*

Considerable variation in the color of alcoholic material is noticeable. More recent specimens show body generally dull or pale bluish-gray above, fading whitish below; dark vertical bands constant in location though variably wide, as in adults some extend width of 3 scales with 3 or 4 scales of pale area intervening; in young dark bands at least broad as pale areas in their upper extent; some adults show them quite pale or bleached out below, sometimes not even extending below eye; last band on caudal peduncle forward may be very faint or even nearly absent in old examples; dark soft dorsal and anal blotch a character of age, as absent in very young, also variable, as it may be extended forward on the fin in a dark streak or simply isolated as a blotch; terminal portion or edges or vertical fins more or less dusky.

We have examined and included the Hawaiian examples in the Academy, of which 3 were wrongly recorded as A. sexfasciatus by Fowler¹⁸⁴. These were obtained by Townsend and Jones.
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Proc. Acad. Nat. Sci. Phila., 1900, p. 504.

Günther wrongly figures this species as Glyphidodon sax-
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atilis, though his figure does not show the dark axillary
 spot, so distinct in our material. Other points of variance
 in his figure are the scaleless pectoral, and pale ventral
 rays brownish.

Compared with Philippine and Sumatran examples of A.
saxatilis (Linnaeus) in the Academy we find the fourth dark
 vertical band begins little before the middle of soft dorsal
 and fifth band on caudal peduncle close to caudal base; soft
 dorsal and anal with nearly median longitudinal dark band on
 each fin, that on anal little broader, but in no case developed
 as pronounced dark blotch on last fin rays.

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Journ. Mus. Godeffroy, vol. 15, heft 7, 1881, Pl. 126, fig. a.

Abudefduf sordidus (Forsk.)

Fig 220-

Head $2 \frac{7}{8}$ to 3; depth $1 \frac{1}{2}$ to $1 \frac{3}{5}$; D. XIII, 14 to
 16; A. II, 15 or 16; 22 or 23 tubes in upper arch of lateral
 line, and 7 or 8 pores in horizontal section to caudal base;
 5 scales above lateral line to spinous dorsal origin, 5 to
 soft dorsal origin, 10 to 14 below to spinous anal origin; 13
 to 20 predorsal scales; snout 3 to $3 \frac{1}{8}$ in head; eye $3 \frac{1}{5}$
 to 4; maxillary $3 \frac{1}{5}$ to $3 \frac{1}{2}$; interorbital $2 \frac{7}{8}$ to 3.

Body ovoid, strongly compressed; caudal peduncle length
 about $\frac{2}{5}$ to $\frac{1}{2}$ its least depth and latter $1 \frac{3}{4}$ to 2 in head.

Head width $1 \frac{1}{2}$ to $1 \frac{2}{3}$ its length. Snout convex, length about $\frac{3}{4}$ to $\frac{4}{5}$ its width. Eye elevated, hind pupil edge about midway in head. Mouth small, terminal, jaws apparently even. Maxillary slightly beyond nostril, not quite to eye; expansion 2 to $2 \frac{1}{4}$ in eye. Teeth uniserial, moderately compressed or incisor-like, ends truncate, rather conic in young. Lips rather wide. Nostril little behind last fourth or last fifth in snout. Interorbital convex. Preopercle and preorbital edges entire.

Rakers ~~5~~+14, about $\frac{3}{5}$ of filaments or $1 \frac{1}{4}$ in eye. Scales in rows parallel with lateral line, converging behind; smaller scales along bases of vertical fins and very small ones extend out over same, basal portions largely covered; opercular scales large; preorbital and muzzle naked; 3 rows of cheek scales; scales with radiating striae 9 to 12; apical denticles 70 to 140; circuli very fine; tubes in lateral line simple, but ends below soft dorsal 3 to 4 scales from caudal peduncle. Fifth dorsal spine $1 \frac{4}{5}$ to $1 \frac{7}{8}$ in head; anal spine $2 \frac{1}{8}$ to $2 \frac{1}{6}$; fifth anal ray $1 \frac{1}{3}$ to $1 \frac{1}{2}$; caudal about 1 to $1 \frac{1}{8}$, moderately forked; pectoral 1; ventral $1 \frac{1}{6}$ to $1 \frac{1}{8}$, reaches vent, close before anal.

Color in alcohol largely dull brownish. Six broad vertical bands of darker, wider than interspaces, reflected on bases of vertical fins. Dusky blotch on caudal peduncle forward nearly

or quite size of eye. Fins dull brown, ventral largely dusky terminally. On some scales of head above each with dark basal blotch. Small dusky spot at central axil. Hind opercle edge dark or dusky. Smaller examples with pale narrow vertical streaks with whitish spot on each scale, also lower abdominal scales same, few on bases of soft dorsal, anal, caudal and ventrally on caudal peduncle. Such examples have not only all fins brownish, except blackish ventral, but with rays and spines basally in front whitish. Length 35 to 136 mm. One from Maui, and another without exact locality probably also Hawaiian? We also include 2 Hawaiian examples in the Academy, and 2 young 28 to 32 mm. long show the dark vertical bands much broader, and the caudal peduncle blotch a black ocellus with a pale bluish-white border.

Rüppell's figure of Glyphisodon sordidus¹⁸⁶ shows the fourth dark vertical band much wider than the others. In all our adults and half-grown examples the front dark bands are wider and the posterior bands slightly narrower. In the young they are of about even or subequal width. Rüppell also shows the first band extending down to the opercle, though now scarcely evident it appears a little more forward in our material. The second band is entirely predorsal in all our examples and extends down close behind the head, without leaving a pale area between Day's figure of Glyphidodon sordidus¹⁸⁷ shows the dark suprascapular and occipital spots, but the 2 dark predorsal¹⁸⁶

Atlas Reis. 2. Af., Fische, 1828, Pl. 8, fig. 1.

¹⁸⁷ Fishes of India, part 3, 1877, Pl. 83, fig. 1

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bands are indicated more backward and in different arrangement from those of our largest example.

Abudefduf septemfasciatus (Cuvier). *Fig. 221.*

Head $2 \frac{2}{3}$ to 3; depth $1 \frac{7}{8}$ to $1 \frac{9}{10}$; D. XIII, 13; A. II, 12 or 13; 20 or 21 tubes in upper arch of lateral line, and 6 to 8 pores in horizontal section to caudal base; 3 or 4 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin, 12 below to spinous anal origin; 15 or 16 predorsal scales; snout 3 to $3 \frac{1}{2}$ in head; eye $2 \frac{3}{4}$ to $3 \frac{7}{8}$; maxillary 3; interorbital $2 \frac{2}{3}$ to 3.

Body rather elongately ovoid, compressed; caudal peduncle length 2 to $2 \frac{1}{2}$ its least depth and latter 2 in head. Head width $1 \frac{3}{5}$ to 2 in its length. Snout convex, width $\frac{3}{4}$ to $\frac{4}{5}$ its length. Eye with hind edge nearly midway in head length, slightly backward in young. Mouth small, jaws about even or lower slightly shorter. Maxillary to or slightly beyond nostril, but only in young reaches eye; expansion 2 in eye, 3 in young. Teeth uniserial, compressed incisors, in medium examples bifid and in young trifid. Lips moderate, larger with age. Nostril at last fifth in snout, slightly more advanced in young. Interorbital convex. Preopercle and preorbital edges entire.

Rakers 3 to 8 + 13 to 15, 11, lanceolate, $\frac{7}{8}$ of filaments,

which $1 \frac{1}{4}$ in eye. Scales in rows parallel with lateral line, converging behind; small scales along vertical fin bases and very small scales extend out over same fins, basal portions largely covered; opercular scales large; muzzle, preorbital and interorbital front naked; 3 rows of cheek scales, none on preopercle flange; scales with radiating striae 8; apical denticles 50 to 107; circuli very fine; tubes in lateral line simple, last ends below soft dorsal 3 scales from caudal peduncle. Fourth dorsal spine 2 in head; fourth dorsal ray $1 \frac{1}{4}$; second anal spine $1 \frac{1}{2}$ to 2; fourth anal ray $1 \frac{1}{3}$; caudal well forked, upper lobe $1 \frac{1}{8}$, little longer than lower; pectoral 1 to $1 \frac{1}{8}$; ventral 1 $\frac{1}{8}$ to 1 $\frac{1}{5}$; reaches anal origin or even to third anal ray base.

Color in alcohol dull or pale brownish generally. Seven deeper brown vertical bands, wider than pale interspaces, first at predorsal and last on caudal peduncle, which young with blackish blotches above; bands extend on dorsal fin bases; fins all brownish, soft dorsals and anal terminally and basally with dull brownish. Black spot, smaller than pupil, in pectoral axil. Length 43 to 160 mm. One from Tongatabu and one without exact locality probably from Fiji or Samoa? We have also examined and include Sumatran examples in the Academy. When fresh in arrack these were pale olivaceous, whitish below; each scale with dark edge; 7 dark gray-brown vertical cross-bands on side; fins dusky; pectoral with small black spot at origin above.

Nexilosus latifrons(Tschudi).

Head 3; depth $1 \frac{7}{8}$; D. XIII, 20; A. II, 13; 22 tubes in upper arch of lateral line; 5 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin; 12 below to spinous anal origin; 34 predorsal scales; snout 3 in head; eye 5; maxillary $3 \frac{2}{5}$; interorbital $2 \frac{3}{4}$.

Body rather elongately ovoid, back elevated, compressed, though robust; caudal peduncle length about $\frac{2}{3}$ its least depth. Snout convex in profile above nostril, then very slightly concave forward; length $\frac{7}{8}$ its width. Eye slightly elevated, hind edge midway in head. Mouth short, broad, jaws about even. Maxillary slightly beyond nostril, though not nearly to eye; expansion $1 \frac{3}{4}$ in eye. Lips rather tough, moderate. Teeth uniserial, even incisor-like though ends slightly convex. Nostril before eye about last third in snout. Interorbital well convex. Preorbital and preopercle edges entire.

Rakers 9+11, lanceolate, 3 in filaments or about $2 \frac{7}{8}$ in eye. Scales in longitudinal rows, upper parallel with lateral line, which little more arched than upper profile of back, rows converging behind; small scales on head above; most all body scales with axillary basal scales, sometimes but one, though usual several, or more as in predorsal, back, breast and belly; preorbital, lips, front of snout narrowly,

front and flange of cheek and most of infraorbital naked; 6 rows of cheek scales below suborbital edge; spinous dorsal entirely covered with moderate-sized scales; soft dorsal, anal, caudal and pectoral largely covered with close-set minute scales; scales with basal radiating striae 9; apical denticles 87; circuli very fine; tubes in lateral line simple, large, well exposed, last 3 scales from caudal peduncle. Fifth dorsal spine 2 in head; sixth dorsal ray $1 \frac{2}{5}$; second anal spine $2 \frac{2}{5}$; fifth anal ray $1 \frac{1}{2}$; caudal deeply emarginate, upper lobe about long as head, lower $1 \frac{1}{8}$; pectoral $1 \frac{1}{5}$; ventral $1 \frac{1}{4}$, not quite to vent. Color in alcohol deep uniform sepia, and no dark axillary blotch. Length 196 mm. One without locality, doubtless from Callao? Peru.

Compared with the figure of Nexilosus albarmarleus by Heller and Snodgrass¹⁸⁸, our example shows but a single opercular spine.

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Proc. Wash. Acad., vol. 5, 1903, p. 204, Pl. 8.

Amphiprion ephippium (Bloch). *Fig. 222.*

Head 3; depth 2; D. X, 18; A. II, 14; scales 36 in upper arch of lateral line, and 9 pores in horizontal section; 6 scales above lateral line to spinous anal origin; 5 above to soft dorsal origin, 17 below to spinous anal origin; 22 pre-

dorsal scales; snout $3 \frac{1}{8}$ in head from upper jaw tip; eye $3 \frac{3}{5}$; maxillary 3; interorbital 3.

Body elongately ovoid, well compressed, deepest at spinous dorsal origin; caudal peduncle length $\frac{3}{4}$ its least depth, which $2 \frac{1}{8}$ in total head length. Head width $1 \frac{3}{4}$ its length. Snout short, width $\frac{3}{4}$ its length. Eye small, elevated, hind edge midway in head (from snout to tip). Mouth small, broad, lower jaw little protruding. Lips rather thick, narrow. Maxillary not quite to eye; expansion 2 in eye. Teeth strong, uniserial, little compressed, conic, largest, forward in each jaw. Nostrils simple pores; from one smaller, about first third in snout; hind one midway in snout. Interorbital convex. Preorbital edge denticulate; smaller denticles on hind preopercle edge; opercle, subopercle and interopercle each, with radiating striae behind, ending in marginal denticles.

Rakers ~~6~~ 12; lanceolate, $\frac{4}{5}$ of filaments, which about 2 in eye. Scales in horizontal rows, converge toward caudal peduncle, mostly uniform on head and trunk; muzzle, front half of interorbital, suborbitals, preopercle flange naked; 5 rows of cheek scales; bases of fins scaly; scales with 6 marginal striae; apical denticles 51 to 60; circuli moderately fine; upper arch of lateral line more convex forward than upper profile, then parallel with latter, ends 5 scales from caudal peduncle; tubes in lateral line large, simple. Second

dorsal spine $3 \frac{1}{2}$ in total head length; last spine $3 \frac{2}{5}$; twelfth dorsal ray $1 \frac{7}{8}$; second anal spine $2 \frac{5}{6}$; third anal ray 2; caudal $1 \frac{1}{5}$; hind edge convex; pectoral $1 \frac{1}{8}$; ventral $1 \frac{1}{6}$.

Color in alcohol dull umber-brown generally, scarcely paler below. Fins likewise. White band, narrow at first, begins 2 scales before spinous dorsal, then slopes obliquely down to embrace hind preopercle edge to hind part of interopercle and at no course of its extent more than 3 scales in width. Length 90 mm. Fiji.

We have compared a rather poorly preserved Sumatran example in the Academy. It shows: Head $3 \frac{1}{6}$; depth $1 \frac{3}{4}$; D. X, 17; A. II, 14. Color when fresh in arrack, with bistre predominant, little paler and slightly ruddy below. Hind half of trunk above and greater part of lower side deep blackish-brown. Fins dilute brownish, paler terminally. Spinous dorsal and anal edges narrowly dusky. Soft anal with narrow dusky edge. Ventral blackish, pale brown on inner edge. Brown blotch on pectoral base medianly, fine pale brown. Iris dark. Length 76 mm.

Dascyllus aruanus (Linnaeus.). *Fig. 223.*

Head $2 \frac{3}{4}$ to $3 \frac{1}{3}$; depth $1 \frac{3}{5}$ to $1 \frac{4}{5}$; D. XII, 12, rarely 11 or 13; A. II, 12, rarely 11; 16 to 18 scales in upper arch of lateral line, and 9 or 10 pores in horizontal section; 4 scales above lateral line to spinous dorsal origin; 2 above to

soft dorsal origin, 11 below to spinous anal origin; 20 to 30 predorsal scales; snout $3 \frac{1}{8}$ to 4 in head from upper jaw tip; eye 2 to $2 \frac{7}{8}$; maxillary $2 \frac{1}{6}$ to $3 \frac{1}{5}$; interorbital $2 \frac{1}{4}$ to $2 \frac{2}{3}$.

Body deeply ovoid, compressed; caudal peduncle length $\frac{3}{4}$ its least depth or $1 \frac{4}{5}$ to 2 in total head length. Head with $1 \frac{2}{3}$ to 2 in its length. Snout convex, length $\frac{2}{3}$ its width. Eye small, little elevated, hind pupil edge about midway in head length. Mouth short, broad, lower jaw slightly protruding. Maxillary well inclined, not quite to eye, or slightly beyond front eye edge; expansion $2 \frac{1}{2}$ in eye. Teeth conic, pointed, outer rows enlarged, and 2 inner rows of smaller ones in each jaw. Front nostril inconspicuous pore about first $\frac{2}{5}$ in snout; hind one at last third in snout, larger. Interorbital convex. Preorbital, preopercle and opercle, also suprascapula, denticulate marginally.

Rakers $7+15$ or 16, lanceolate, little shorter than filaments and latter about $1 \frac{3}{5}$ in eye. Scales narrowly imbricated, in longitudinal rows, converge little at caudal peduncle; small scales crowded along fin bases and out on fins, especially soft rays; head, except lips, entirely scaly, and very small on upper surface inclusive of snout, except narrow front edge of latter; row of suborbital scales and 4 rows on cheek below to preopercle edge; basal radiating

striae 5; apical denticles 65 to 85; circuli very fine; lateral line more convex than dorsal profile; tubes in lateral line simple, large, and 3 or 4 scales behind last to caudal peduncle. Third dorsal spine 1 to $1 \frac{2}{3}$ in head; last spine $1 \frac{7}{8}$ to 2; fourth dorsal ray $1 \frac{1}{2}$ to $1 \frac{2}{3}$; second anal spine $1 \frac{3}{4}$ to $1 \frac{7}{8}$; fourth anal ray $1 \frac{2}{5}$ to $1 \frac{1}{2}$; caudal forked, rather wide lobes pointed, 1 to $1 + \frac{1}{8}$; pectoral $1 \frac{1}{6}$ to $1 \frac{1}{4}$; ventral 1 to $1 + \frac{1}{4}$.

Color in alcohol whitish generally. First broad blackish band from predorsal down including hind half of interorbital, then below eye including preorbital and mandib, e before hind maxillary end; second band from fifth to eighth dorsal spines down to pectoral origin and axil to same of ventral; third band from last dorsal spine, most of soft dorsal, front of caudal peduncle and soft anal to near end of spinous anal. Spinous dorsal blackish-brown broadly over terminal portion and hind edges of soft dorsal and anal whitish. Caudal and pectoral whitish. Ventral blackish-brown. Length 22 to 78 mm. One from Tonga, and fourteen without definite locality likely Polynesian.

The above agree with material in the Academy from Tahiti, Samoa and the Philippines, though an example recorded as D. aruanus by Fowler from Sumatra¹⁸⁹ is properly D. arcuatum Cantor. Whe freshly received in arrack it was pearly-white.

¹⁸⁹

Journ. Acad. Nat. Sci. Phila., (2) vol. 12, 1904, p. 533.

Blackish-brown band begins on first three dorsal spines and extends down to mandible, including eye. This band also joins its fellow on upper side of head in hind interorbital space and on all of predorsal. Another broad blackish-brown band crosses spinous dorsal, inclusive of fifth to ninth spines, down to ventral bases, also including pectoral base. Ventral entirely blackish-brown. Third broad band begins in front part of soft dorsal and extends down to include greater portion of anal. Upper portion of spinous dorsal dusky. Caudal gray-dusky basally. Hind anal rays tipped whitish. Pectoral grayish. Iris dull orange. Peritoneum dusky-gray. Length 70 mm.

D. arcuatum differs from D. aruanus largely in the first dark band encroaches on first 3 dorsal spines and within 2 scales of second dark band. Our Sumatran example does not show the white predorsals indicated by Bleeker.¹⁹⁰

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Tetradrachmum arcuatum Bleeker. Atlas Ich., vol. 9, 1877, Pl. 10, fig. 6.

Dascyllus reticulatus (Richardson). *Fig. 224.*

Head 3 to $3\frac{1}{4}$; depth $1\frac{2}{5}$ to $1\frac{3}{5}$; D. XII, 14 or 15; A. II, 12 to 14; scales 18 OR 19 in upper arch of lateral line and 8 or 9 pores in horizontal section; 4 or 5 scales above lateral line to spinous dorsal origin, 2 or 3 to soft dorsal origin, 11 or 12 below to spinous anal origin; 32 predorsal scales; snout 3 to $3\frac{2}{5}$ in head from upper jaw tip; eye $2\frac{1}{2}$ to $2\frac{3}{4}$; interorbital $2\frac{1}{4}$ to $2\frac{3}{4}$.

Body deeply ovoid, deepest forward, strongly compressed; caudal peduncle length $\frac{2}{3}$ its least depth which $1\frac{5}{6}$ in total head length. Head width about $1\frac{2}{3}$ its length. Snout convex over surface, length $\frac{2}{3}$ its width. Eye large, little elevated, hind pupil edge midway in head length. Mouth broad, short, lower jaw very slightly protruding. Maxillary nearly vertical, about to eye; expansion 3 in eye. Teeth conic, slightly compressed, ends pointed, uniserial. Front nostril inconspicuous pores near first $\frac{2}{5}$ in snout; hind one larger, slightly before last fourth in snout. Interorbital convex. Preorbital, suprascapula and lower preopercle edge denticulate; few weak denticles on lower hind opercle edge and 3 spines above.

Rakers ~~8-17~~ 7, lanceolate, $1\frac{1}{3}$ in filaments, which 2 in eye. Scales narrowly imbricate, in longitudinal rows converging at caudal peduncle; small scales crowded on fin bases, especially soft rays, smaller on upper surface, inclusive of snout; row of narrowly imbricate scales on suborbital and 7 rows below to preopercle edge or 3 to ridge; basal radiating striae 6 or 7; apical denticles 87 to 90; circuli very fine; lateral line little more arched forward than dorsal profile; tubes in lateral line large, simple, and 4 scales after last to caudal peduncle. Second dorsal spine $1\frac{1}{3}$ to $1\frac{4}{5}$ in total head length; last spine $2\frac{1}{10}$ to $2\frac{1}{3}$; fourth dorsal ray $1\frac{2}{3}$ to $1\frac{3}{4}$; second anal spine $1\frac{2}{5}$ to $1\frac{4}{5}$; fifth

anal ray $1 \frac{1}{3}$ to $1 \frac{2}{5}$; caudal slightly emarginate behind, little larger than head to $1 \frac{1}{8}$ its length; pectoral 1 to $1 \frac{1}{10}$; ventral $1 \frac{1}{8}$ to $1 \frac{1}{4}$.

Color in alcohol pale umber-brown generally. Edge of each scale darker, forming a reticulate pattern. Pectoral axil with small dusky-brown spot, much less than pupil. Fins dull brown, spinous dorsal and ventral blackish. Length 43 to 78mm. Three without definite locality, ~~likely from Maui,~~

~~Fiji or Samoa?~~ *Drawing by Richard of an example from Oahu.*

We have also examined a series of Philippine examples in the Academy, which were wrongly recorded as D. trimaculatus by Fowler.¹⁹¹ The figure of D. albisella of Jordan and Evermann¹⁹² is simply a copy of Bleeker's figure of D. trimaculatus¹⁹³ with the light spot at the twelfth and thirteenth scales of the lateral line darkened by the engraver. Although they contended D. albisella was apparently distinct no characters of distinction were given, and the inference would be gathered from their description that D. albisella has a large white blotch on the side in youth, which disappears with age. Later Jordan and Seale state "it has a white vertical bar where the latter species

D. trimaculatus has a white spot".¹⁹⁴ Kendall and Goldsborough¹⁹¹

Copeia, No. 58, June 18 1918, p. 64.

¹⁹² Bull. U.S.Fish Com., vol. 23, pt. 1, 1903 (1905), p. 267.

¹⁹³ Tetradrachmum trimaculatum Bleeker, Atlas Ich., vol. 9, 1879, Pl. 407, fig. 8.

¹⁹⁴ Bull. Bur.Fisher., vol. 25, 1905 (1906), p. 290.

say " it is possible that D. albisella Gill from Hawaii is the same as this species. The white bar (which is the only character separating the species) in the Hawaiian specimens is quite large in the small examples(1 inch) and becomes gradually smaller in larger examples; in a 2-inch example it extends only half as far down on the body as in the small(1 inch) examples; we have no larger specimens of D. albisella, but believe as the fish becomes larger, the spots are smaller, and gradually disappear. In the specimen of D. trimaculatus 4 3/4 inches long, the spot has almost entirely disappeared".¹⁹⁵

In the Academy we find only one example of the alleged D. albisella from Oahu, long in alcohol and though in poor preservation, with the broad white blotch on middle of side extending over at least 6 to 8 scales. It is about 35 mm. long without the broken caudal. Of D. trimaculatus we examined 3 adults, 90 to 95 mm. long, from Sumatra. These all have the white spot on the arch of the lateral line; variable over 1 to 3 scales, even variably large or small on either side of the body. An examination of the scales shows no distinctive characters; basal radiating striae 7 to 9; apical denticles 80 to 117.

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Mem.Mus.Comp.Zool.,vol.26,no.27,1911,p.298.

The Wilkes examples of D. reticulatus all agree with Bleeker's figure, except they are generally darker, evidently due to their long preservation in spirits.

Chronis cupreus Fowler and Bean.

Chronis cupreus Fowler and Bean,

Proc. U. S. Nat. Mus., 63, 1923, p. 22.

Fiji or Samoa?

~~Chromis cupreus~~

Chromis ovalis (Steindachner). ^{4 fig. 225.}

Head ^{to 3 1/2} 3 1/3; depth ^{to 2 1/5} 1 7/8; D. XIV, ^{13 or} 14; A. II, ^{13 or} 14; scales ^{to 20} 18 in upper arch of lateral line and ^{8 or} 9 pores in horizontal section to caudal base; ^{on 4} 3 scales above lateral line to spinous dorsal origin, ^{on 3} 2 to soft dorsal origin; 10 below to spinous anal origin; ^{35 to} 40 predorsal scales; snout ^{to 4 1/8} 4 in head from upper jaw tip; eye ^{to 3 3/4} 2 4/5; maxillary 3; interorbital 2 4/5.

Body deeply ovoid, compressed; caudal peduncle length 2 in its least depth, which ^{to 2 1/5} 2 in total head length. Head width 1 2/3 its length. Snout convex, length 2/3 its width. Eye scarcely elevated, hind pupil edge midway in head length. Lower jaw projects. Mouth small, broad. Maxillary to eye;

expansion 3 in eye. Teeth conic, simple, small, uniserial, ^{except in front of each jaw, where short inner row of smaller similar teeth} and close-set in jaws; few irregular smaller inner teeth

also in front of each jaw. Lips moderately narrow. Nostril near last fourth in snout profile. Interorbital convex. Preorbital and preopercle ridges entire, flange slightly crenulate, but no distinct serrae.

Rakers ^{to 10 to 23} 7+20, lanceolate, 7/8 in filaments, which ^{1 3/5 to} 1 3/4 in eye. Scales in rows parallel with lateral line, converge behind, smaller scales all along body edges, and still smaller ones out over vertical fins, over greater basal portions at least; muzzle, except lips, covered densely with small scales and similarly about occipital region; cheeks rows of scales 5 ^{to 5} 7 or 8, with 3 between eye and preopercle ridge; basal radiating

to 8, sometimes 5 or 6 auxiliaries
to 170

striae 6; apical denticles 117; circuli very fine; tubes of lateral line simple, large, well exposed, last ends opposite front of soft dorsal or about 8 scales from caudal peduncle. Fourth dorsal spine ^{1 3/4 to} 1 7/8 in head; last dorsal spine ^{1 1/2 to} 1 7/8 and apparently rays (damaged) subequal; second anal spine 1 2/3 ^{to} 2; first anal ray 1 3/4; caudal forked, lobes (damaged) apparently little less than head; pectoral (damaged) ^{to 1 1/2} 1; ventral 1 1/8 ^{to} to vent, which 3/5 ^{to} of eye-diameter before vent.

Color in alcohol warm sepia, little paler below, but generally mostly uniform. Fins slightly dusky. Pectoral axil with large blackish blotch inside. Length 143 mm. ^{Two,} ~~One~~ without definite locality, likely from Maui? ^{Four drawings by Richard, 1 from example from Maui and 3 from Oahu.} Jenkins describes this species as C. velox¹⁹⁸, his figure varying a little from our example. Thus he shows a depressed profile over the eye, only 4 scales after the last tube in upper arch of lateral line, dorsal spines posteriorly much shorter and pectoral at least reaching opposite anal origin. Jordan and Evermann describe the color in alcohol as brownish or dusky-olive above; silvery-yellowish below; base of pectoral black, color not extending to axil; about 8 distinct longitudinal disk-like streaks along side of body below dorsal region, following rows of scales; membranes of spinous dorsal black; soft dorsal and anal dusky; caudal dusky-brown. Our example differs in its largely dark sepia color, fins inclusive, and the blackish axillary.

Chromis caeruleus (Cuvier). 759. 226.

Head 3 to $3 \frac{1}{2}$; depth $2 \frac{1}{10}$ to $2 \frac{1}{4}$; D. XII, 9 or 10; A. II, 9 or 10; scales 15 or 16 in upper arch of lateral line, and 9 or 10 pores in horizontal section to caudal base; 2 or 3 scales above lateral line to spinous dorsal origin, 1 or 2 to soft dorsal origin, and 7 or 8 below to spinous anal origin; 25 to 33 predorsal scales; snout $3 \frac{2}{5}$ to 4 in head; eye $2 \frac{2}{5}$ to $3 \frac{1}{2}$; maxillary $2 \frac{1}{4}$ to $2 \frac{2}{5}$; interorbital $2 \frac{2}{5}$ to $2 \frac{3}{4}$.

Body ovoid, compressed; caudal peduncle long as deep, least depth 2 to $2 \frac{1}{4}$ in total head length. Head width $1 \frac{3}{4}$ to 2 in its length. Snout convex, length $\frac{3}{4}$ to $\frac{4}{5}$ its width. Eye scarcely elevated, hind pupil edge about midway in head length. Mouth rather large, oblique, jaws even or lower slightly protruding. Maxillary little beyond eye front or to pupil; expansion 2 in eye. Lips rather narrow. Teeth small, simple, well-spaced, conic, short and mostly uniserial in jaws; upper jaw in front with inner row of smaller inconspicuous similar teeth; outer upper teeth with 2 short canines in front; lower jaw with patch of very small teeth in front; also front edge of lower jaw with 6 short conic teeth externally and all directed outwards; maxillary teeth extend to rictus, where mostly concealed. Nostrils 2 small pores, close together, at last third in snout. Interorbital convex. Suborbital edge not free below and behind eye; preopercle and suprascapular edges entire.

Rakers 9+21, lanceolate, $7/8$ of filaments, which $1\frac{1}{3}$ in eye. Scales in even longitudinal rows, scarcely smaller along body edges; dorsals and anals naked, except few inconspicuous basal scales; caudal covered with small scales basally; mandible, preorbital, top of snout, interorbital and crown of head covered with small crowded scales; cheek scales in 4 rows; scales with 5 basal radiating striae; apical denticles 76 to 95; circuli fine; upper arch of lateral line more convex forward than dorsal profile, tubes simple and 3 scales behind last to caudal peduncle. Third dorsal spine $1\frac{7}{8}$ to 2 in head; last spine $2\frac{7}{8}$ to $3\frac{1}{4}$; fourth dorsal ray $1\frac{1}{4}$ to $1\frac{1}{2}$; second anal spine 2 to $2\frac{1}{3}$; fourth anal ray $1\frac{3}{4}$ to $1\frac{7}{8}$; caudal deeply forked, sharply pointed lobes $1\frac{1}{5}$ to $1\frac{1}{5}$; pectoral 1 to $1\frac{1}{4}$; ventral $1\frac{1}{10}$ to $1\frac{1}{6}$.

Color in alcohol brownish on back, fresh examples blue. Lower surface paler to whitish. Each scale of back with dark center, and edge of back obscurely pale, also obsolete streak from shoulder to caudal base medially. Edge and base of spinous dorsal dusky, otherwise vertical fins slightly dusky. Pectoral and ventral pale; front edge of latter whitish. Head above with few obscure dark spots, but no distinct ocellus at lateral line origin. Pectoral axil very slightly dusky. Iris slaty. Length 28 to 100 mm. Four examples without definite locality, doubtless from Fiji and Samoa? We also include a series from Samoa and the Philippines, examined in the Academy.

Besides the drawing of an example from Fiji by Richard in color sketch by J. Drayton, labeled Fiji, which says "common in the reefs of all the islands."

Chromis crassa (Valenciennes). Fig. 227.

Figure of an example from Peru and
one from Callao, both by Richard.

Cichlidae:

Geophagus brasiliensis (Loy and Richard) Fig. 228.

Drawing of an example from Rio
Janeiro by J. H. Richard.

8 basal radiating striae, sometimes 5 or 6 auxiliaries; apical denticles 140 to 170; circuli very fine; tubes in upper arch of lateral line simple, large, well exposed, last one about opposite third dorsal ray base or 8 scales from caudal peduncle. Fourth dorsal spine $1 \frac{3}{4}$ in head; last spine $\frac{2}{3}$, apparently little shorter than rays(damaged); second anal spine 2; third anal ray $1 \frac{4}{5}$, caudal forked, lobes (damaged) apparently little shorter than head; pectoral $\frac{1}{6}$? (damaged); ventral $\frac{1}{6}$ to vent, which latter about an eye-diameter before anal.

Color in alcohol uniform sepia, generally paler below. Axil pale below, without dark blotch. Traces of dark spot on upper portion of opercle(scales fallen). Length 143 mm. One without exact locality, ~~likely from Maui?~~

~~This species was evidently described by Jenkins from a damaged example, as his figure shows a young individual about 50 mm long¹⁹⁶. The figure in question, is quite crude, even for the young fish it is supposed to represent. It differs from our example in that the muzzle is naked, as ours has it entirely scaly; its cheek scales are represented subequal in size, while ours has the median scales larger; the scales in our example on the preopercle flange are not as Jenkins represents; he shows the scales with finely asperous edges, in our example though finely ciliated the denticles are not visible to the naked eye, the skin scales edges having an entire appearance.~~

~~196~~

~~Bull. U.S. Fish Com., vol. 22, 1902(1903), p. 457, fig. 23.
Honolulu.~~

Geophagus brasiliensis (Quoy and Gaimard). *Figs 228.*

Head $2 \frac{3}{4}$; depth $2 \frac{2}{5}$; D. XV, 11; A. III, 8; tubes in upper arch of lateral line 20, horizontal section with 10 to caudal base and 2 more on latter; 5 scales between spinous dorsal origin and lateral line and 2 above to soft dorsal origin; 9 scales below upper arch of lateral line to spinous anal origin; 14 predorsal scales; snout $2 \frac{1}{5}$ in head from upper jaw tip; eye $3 \frac{7}{8}$; maxillary $3 \frac{1}{8}$; interorbital $3 \frac{2}{5}$. Head width $1 \frac{9}{10}$ its total length. Snout width $1 \frac{1}{5}$ its length. Interorbital slightly convex. Rakers 5 + 10, short, mostly tubercular, about $\frac{1}{4}$ of filaments, which half of eye. Scales with basal rudimentary striae 10 to 13; apical denticles 100 to 115; 6 rows of cheek scales. Caudal slightly convex behind. Faded dull brownish in alcohol, mostly uniform. Length 122 mm. Rio Janeiro. *Drawing*

of an example from Rio Janeiro by Richard.

58/

LABRIDAE.

Lepidaplois hirsutus (Lacépède). *Fig- 229.*

Head $2 \frac{3}{4}$; depth $2 \frac{3}{4}$; D. XII, 10, 1; A. III, 12; scales 30 in lateral line to caudal base and 4 more on latter; 7 scales above lateral line to spinous dorsal origin, 6 to soft dorsal origin, 15 below to spinous anal origin; 16 predorsal scales to median occiput; snout $3 \frac{2}{5}$ in head from upper jaw tip; eye 4; maxillary 3; interorbital $4 \frac{1}{2}$; head width $2 \frac{1}{2}$. Snout conic, long as wide. Preopercle edge entire below, minutely serrated behind. Rakers $8+12$, short, robust, lanceolate, 2 in filaments, which $2 \frac{1}{5}$ in eye. Head largely with small scales, preorbital, interorbital and muzzle naked; 12 scales below eye to preopercle ridge angle; predorsal, back and breast scales little smaller than elsewhere on trunk; usually smaller and mostly lanceolate scales extend on bases of dorsals and anals or well over basal half of each fin; caudal (damaged) with at least basal third covered with large scales; basal radiating striae 16 to 18; apical striae rather obscure, many continuous with fine circuli, about 50 or more and often broken or imperfect; tubes well exposed, each with 1 or 2 prongs above.

Color in alcohol brownish generally, little paler below. On head dark median band from snout tip to occiput, with equally broad one each side and parallel, also narrower superciliary

line. Broad dark band from each side of snout to eye, nearly wide as latter and continued up on post-ocular and upper region of opercle, and separated medianly to form 2 bands, of which lower slightly broader. Another dark band, narrower, extends from maxillary across preopercle angle to gill-opening. Trunk with many longitudinal dark bands or lines, following within junctures of scales so that median area of scale pale and lines about edges much narrower and paler. Fins all pale brown, second membrane of spinous dorsal dusky. Front ventral edge brownish, rest of fin pale. Blackish-brown blotch at last basal half of soft dorsal and on back below, but not to lateral line. Length 113 mm. (caudal damaged). Maui.

The Polynesian species of Lepidaplois have been very unsatisfactorily characterized. The oldest name for the species with the large blackish blotch at front of caudal peduncle is Labrus hirsutus Lacepede. His crude figure, however, does not show the black predorsal blotch, the anal edge is not dark, though the longitudinal pale stripes are shown, and those above lateral line broken up as little spots. L. macrourus Lacepede also has the large transverse blackish blotch at the front of the caudal peduncle as shown in Lacepede's figure, and so arranged to embrace the last dorsal rays and last half of the anal. The black blotch at front of spinous dorsal nearly midway in fin and only extended over first 2 membranes. Unlike the preceding figure the entire anal edge is blackish. L. bilunulatus Lacepede shows the dark blotch below the dorsal, but above

the lateral line and 3 pale streaks on the head. Likely the intervening darker band had faded out? As Cossyphus bilunulatus Valenciennes¹⁹⁹ describes an example 153 mm long from Mauritius, which agrees in the black blotch on back below soft dorsal. Bleeker figures an Amboina example²⁰⁰ (his specimens 190 to 210 mm. long), with much broader dark bands on the head; evidently a variation or the upper possibly a fusion of the 2 bands seen in our example. Next Gunther records C. bilunulatus from Mauritius, Amboina, Misol and Hawaii²⁰¹, and is probably correct in contending that C. albotaeniatus Valenciennes is synonymous.

Crenilabrus chabrolii Lesson²⁰² has a black band at the caudal peduncle in front, like Labrus hirsutus Lacépède and L. macrourus Lacépède. Its ventrals are dark reddish-brown, soft dorsal edge pale, though that of anal dark and only first 2 membranes of spinous dorsal dusky. There are shown moreover 3 distinct upper hind teeth and one lower, besides 2 forward below.

199

Hist. Nat. Poiss., vol. 13, 1839, p. 87.

200

Atlas Ichth., vol. I, 1862, p. 160, Pl. 38, fig. 3.

201

Journ. Mus. Godeffroy, vol. 15, heft 7, 1881, p. 240, Pl. 130.

202

Voy. Coquille Zool., vol. 2, 1830, p. 133, Pl. 38. Baie du Tombeau, a l'île Maurice.

Cossyphus moldat Valenciennes²⁰³ is another synonym.

Valenciennes says: "Une large tache novil carrie coubre l'extrémité postérieure du tronc et la plus grande partie de la queue; elle s'étend du troisième rayon. mon de la dorsale au huitième de l'anale." His example was 203 mm. C. albotaeniat Valenciennes²⁰⁴, based on a slightly smaller Hawaiian example is another synonym.

Lepidaplois strophodes Jordan and Evermann²⁰⁵ is certainly with the same general color-pattern of Labrus hirsutus Lacepede, and therefore may be placed as a synonym. Finally Lepidaplois richardsoni Fowler²⁰⁶, which in every way agrees with our Maui example, when compared, is also synonymous. It shows similar scale structure, or basal radiating striae 17 or 18.

203

Hist. Nat. Poiss., vol. 13, 1839, p. 82. Isle de France.

204

L.c.p. 141.

205

Bull. U.S. Fish Com., vol. 22, 1902(1903), p. 190; vol. 21, pt. 1, 1903(1905), p. 280, Pl. 23.

206

Proc. Acad. Nat. Sci. Phila., 1907, p. 434, fig. 7. "Victoria".

Lepidaplois loxozonus Snyder. Fig. 230.

Lepidaplois loxozonus Snyder, Proc.
U. S. Nat. Mus., 35, 1909, p. 95.
Naha, Okinawa.

Lepidaplois trotteri Fowler and Bean,
Proc. U. S. Nat. Mus., 63, 1923, p.
20. Pomotou Island.

A comparison of the types in
the National Museum shows these
two nominal species to be the same.

Pseudolabrus guntheri Bleeker. dorsalis Macleay. Fig. 232.

Head 3 to 3 1/4; depth 2 3/4 to 3; D. IX, 11, i; A. III, 10, i; scales 24 in lateral line to caudal base and 2 more on latter; 4 scales above lateral line to spinous dorsal origin, 2 above to soft dorsal origin, 8 to 10 below to spinous anal origin; 6 to 9 predorsal scales; snout, 3 to 3 1/5 in head from upper jaw tip; eye 5 1/4 to 6; maxillary 3 1/5 to 3 3/4; interorbital 3 7/8 to 4 1/5.

Head width 2 to 2 1/8 in total head length. Snout conic, width 1 to 1 1/6 its length. Canines sometimes variable or irregular, even 2 crowded one side above and 4 others below. Upper lip with 6 longitudinal grooves. Interorbital convex. Preopercle edge entire; membranous. Vakers 7+12, short, lanceolate, 2 in filaments, latter 1 1/3 in eye. Head naked, except 4 rows of scales on cheeks and scaly opercles; predorsal, chest, breast and scales over caudal basally smaller than elsewhere on trunk; also small scales along bases of soft dorsal and anal and in caudal extend over 3/4 of fin from base; basal radiating striae 22 to 29; apical radiating striae 31 to 34, most joining few reticulations in center of scales; slender tubes in lateral line well exposed, smaller examples with several short prongs, joined and little more extensive as reticulations in larger example. First dorsal spine 4 1/5 to 5 3/5 in total head length; last spine 2 4/5 to 3; first dorsal ray 2 1/3 to 2 1/2; third anal spine 3 1/5 to 3 1/3; first anal ray

$2 \frac{1}{4}$ to $2 \frac{2}{3}$; caudal $1 \frac{1}{8}$ to $1 \frac{1}{3}$, slightly emarginate behind; pectoral $1 \frac{1}{3}$ to $1 \frac{1}{2}$; ventral $1 \frac{2}{3}$ to 2.

Color in alcohol largely faded dull brownish, scarcely paler below, fins bases little more brownish: Membrane between second and third dorsal spines black, extends partly on first membrane in larger example. Though the larger examples show traces of small scattered spots of blackish, these most distinct at present in smallest. Several also along dorsal edge of back at dorsal fin bases, and 5 along upper arch of lateral line with last at same height on caudal peduncle. Also traces of several dark spots on lower part of side, and behind eye on head. Three examples from Sydney and New South Wales, the other also doubtless from Sydney? Length 147 to 197.

A painting by Drayton, January 10, 1840, Sydney is generally colored biscay-green. Head with scarlet narrow band from above eye toward occiput; another forward over nostril; one from lower front eye edge forward to snout tip and back over post-ocular across opercle, also faint back over pectoral and soon faded; another from lower hind eye edge back toward pectoral origin; one from lower eye edge toward mouth corner and finally one from near mouth corner toward lower pectoral base, though faint on prefectoral region; small scarlet spot close below eye and another below mouth corner. Iris pale biscay green. Edge of spinous dorsal scarlet, extended back submarginally along soft dorsal, its outer portion pale, and

fin edge narrowly gray. Basal portion of spinous dorsal greenish-blue slate; front part of spinous dorsal over first 2 membranes with large subbasal black blotch. Anal blue-green slate, base narrowly obscure old rose. Caudal broadly marginal biscay-green behind, with broad submarginal olive area, fin paler basally. Pectoral pale yellowish green. Ventral paler, front edge old rose. Trunk with hind portion dull old rose. Small black spots above lateral line as described for alcoholic specimens.

A drawing by Richard agrees largely with the preceding, but differs in 28 scales in lateral line of which last 2 on caudal base, 6 rows of cheek scales and scales with too few striae. It shows black blotch at front of spinous dorsal submarginal, whereas it is median or low in Drayton's painting. The dark spots on the head are not evident in the specimen.

A drawing by Dougal, January 1847, and one by Richard, 1858 represent our larger examples. Dougal shows a black spot at the pectoral origin, now faded and much more evident in Richard's figure. Dougal has a better caudal as he shows a larger squamous area. Both show 5 rows of cheek scales though the specimens have but 4. The concave caudal is evidently a condition of age, as Richard's figure is from a larger example.

5789

Pseudolabrus celidota (Schneider). *Figs 233 and 234.*

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth 3 to $3 \frac{1}{3}$; D. IX, 11, 1; A. III, 10, 1; scales 24 or 25 in lateral line to caudal base and 2 more on latter; 4 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin, 9 below to spinous anal origin; 7 or 8 predorsal scales; snout 3 to $3 \frac{1}{6}$ in head; eye 4 to $5 \frac{3}{5}$; maxillary $3 \frac{2}{5}$ to 4; interorbital $4 \frac{3}{4}$ to $5 \frac{2}{5}$.

Body elongate ovate, compressed; caudal peduncle long as deep, least depth $2 \frac{2}{5}$ to $2 \frac{2}{3}$ in head. Head width $2 \frac{1}{3}$ to $2 \frac{3}{5}$ its length. Snout conic, width at eye front $1 \frac{1}{8}$ to $1 \frac{1}{3}$ its length. Eye elevated, hind edge slightly before middle in head length, or slightly posterior in smaller example; eye $1 \frac{1}{4}$ to $2 \frac{1}{2}$ in snout. Mouth small, lower jaw slightly shorter. Maxillary to hind nostril, reaches front nostril in young. Teeth uniserial, usually 2 canines above and 4 below in front, variable, as sometimes 4 in each jaw, or irregular; other teeth all gradually smaller backward. Front nostril at last fourth in snout, hind one closer behind though nearer than to eye. Interorbital convex. Preopercle edge membranous, free. Rakers 6-10, short points, 3 in filaments, latter $1 \frac{1}{2}$ in eye. Scales in 6 rows on cheek, seldom 5, and large on opercles, otherwise head naked; scales little small on breast and caudal with small scales, at least on basal half; basal radiating striae 19 to 25; apical denticles 25 to 62; tubes in lateral line with 2 to 5 branchlets, fewer in young. Color in alcohol dull brownish generally, lower surface paler. Fins all pale brownish, inner ventral edges whitish. Length 99 to 205 mm.

Five from New Zealand. *Drawing by Richard of a New Zealand example in 1858.*

A painting of one of the above by Drayton C. Agate, April, 1840, is from Bay of Islands and said to be very abundant.

Back and head above olive. Iris salmon-orange. Sides of head

and trunk ecru-olive. Obscure dark streak from behind eye to lateral line origin. Another below and across opercle toward end of opercle flap. Also trace of another short one below, parallel, though only an opercle. Black blotch 2 scales beyond pectoral tip extends over 4 scales of lateral line and about 2 scales below. Lips, head below, breast, abdomen and under body surface white. Dorsals uniform saccardO-olive. Caudal light minderal-gray. Pectoral transparent. Ventral, except innermost ray and spine, which white, wax-yellow. Anal entirely wax-yellow.

Another painting by J. Drayton, March, 1840, is labeled Bay of Islands, very abundant. It differs in color, according to an area of blackish on back above lateral line and pectoral; dorsals pinkish; anal pale bluish, with longitudinal pale wide pink band; sides of breast and abdomen also pink; bluish tints on scales along middle of side; purpil green. Both this and the preceding are show with the hind caudal edge convex. Still another figure, by Richard, on a New Zealand example, shows the hind caudal edge concave, fewer anal rays and scales.

Pseudolabrus coccineus (Schneider).

Head $2 \frac{7}{8}$; depth $3 \frac{1}{8}$; D. IX, ii; A. III, 10; scales 25 in lateral line to caudal base and 3 more on latter; 4 scales above lateral line to spinous dorsal origin; 3 above to soft dorsal origin, 9 below to spinous anal origin; 9 pre-dorsal scales; snout $3 \frac{2}{5}$ in head; eye 5; maxillary 4; inter-orbital $5 \frac{2}{5}$.

Body elongate ovoid, compressed; caudal peduncle length $\frac{4}{5}$ its least depth, latter $2\frac{2}{5}$ in head. Head width $2\frac{2}{5}$ its length. Eye elevated, $1\frac{2}{5}$ in snout, hind edge slightly before middle in head length. Mouth moderate, lower jaw slightly included. Maxillary concealed by preorbital, to hind nostril. Pair of large canines in front of each jaw, lower closer and fit in between upper; behind canines row of simple conic teeth along each jaw edge gradually smaller to rictus, first but little smaller than canines; maxillary with small, strong, concealed canine. Lips equally wide, lower about $\frac{2}{3}$ horizontal pupil length and upper with longitudinal grooves. Nostrils well separated, front one about last fourth in snout; hind one superior, larger, about midway between front one and eye. Interorbital convex, depressed slightly in middle. Preopercle edge entire, membranous.

Rakers $5+10$, short, lanceolate, 3 in filaments, which half of eye. Head mostly scaly, muzzle, preorbital, interorbital, chin and preopercle flange naked; 5 rows of cheek scales; body scales rather uniformly large, those on breast and chest smallest and on $\frac{1}{2}$ predorsal medium; caudal mostly with small scales over $\frac{2}{3}$ of fin basally, other fins naked; basal radiating striae 26 or 27; apical radiating striae 20 and about 12 to 16 more imperfect ones marginally, all crossing circuli; all convergent,

though only median pair join basal striae; lateral line complete, mostly concurrent with dorsal profile, until below last dorsal rays, when dropping suddenly midway along caudal peduncle side; tubes slender, well exposed to branch as vertical midrib, which usually forms 2 to 4 horizontal backward branches. First dorsal spine $3 \frac{3}{4}$ in head; last spine $2 \frac{1}{2}$; first dorsal ray $2 \frac{1}{3}$; third anal spine 3; first anal ray $2 \frac{1}{2}$; caudal slightly emarginate behind, $1 \frac{1}{5}$; pectoral $1 \frac{1}{5}$; ventral $1 \frac{4}{5}$.

Color in alcohol faded dull brown, paler below. Each scale along back and upper surface with obscure median pale streak. Fins all dull brown, inner ventral edge whitish. Length 172 mm. New Zealand.

This example differs from Waite's figure²⁰⁹ in the absence of the dark basal caudal band and the dark upper and lower edges of the same fin. Labrichthys resipunctata Hutton²¹⁰ is evidently the young, as suspected by Waite, and more nearly agrees with our example.

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Record. Canterbury Mus., vol. 1, No. 3, 1911, p. 224, Pl. 46.

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Trans. New Zeal. Inst., vol. 12, 1880, p. 455.

Pseudolabrus tetracus (Richardson) Fig. 235

Painting by J. Drayton, of small or
young example obtained at Sydney,
January 3, 1840.

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Fig. 236.

Pseudolabrus gymnoⁿgenis (Günther).

Head $2 \frac{2}{3}$ to 3; depth $2 \frac{3}{5}$ to $2 \frac{1}{4}$; D. IX, 11, 1; A. III, 10, 1; scales 24 or 25 in lateral line to caudal base and 2 more on latter; 4 scales above lateral line to spinous dorsal origin; 2 scales above to first dorsal ray base, 8 or 9 scales below to spinous anal origin; 5 predorsal scales; snout $3 \frac{2}{5}$ to 4 in head; eye $5 \frac{1}{2}$ to 4; maxillary $3 \frac{1}{5}$ to $3 \frac{4}{5}$; interorbital 4 to $4 \frac{2}{5}$.

Body compressed; caudal peduncle length $1 \frac{1}{4}$ to $1 \frac{3}{4}$ its least depth, which $1 \frac{7}{8}$ to $2 \frac{1}{4}$ in total head length. Head width $1 \frac{7}{8}$ to $2 \frac{1}{6}$ its length. Eye ; $\frac{2}{5}$ to $1 \frac{2}{3}$ in snout, 1 in young. Interorbital convex. Preopercle edge entire, membranous. Rakers 5 + 11, short, lanceolate, 3 in filaments, which $1 \frac{1}{8}$ in eye. Head largely naked, except single oblique row of large and rather coarsely striate scales from postocular down to middle of cheek, latter otherwise with rugose crowded vermiculate striae; cheek naked in young; smaller scales on predorsal, breast, along soft dorsal and anal bases and on caudal; basal radiating striae 21 to 27; apical striae 37 to 55, emanating from median vertical divisional line; aborescent tubes in lateral line well exposed. First dorsal spine $4 \frac{1}{6}$ to 5 in head; last dorsal spine $3 \frac{1}{10}$ to $3 \frac{3}{5}$; first dorsal ray $2 \frac{2}{5}$ to $2 \frac{4}{5}$; third anal spine $3 \frac{1}{3}$ to $3 \frac{2}{5}$; first anal ray $2 \frac{1}{3}$ to $2 \frac{1}{2}$; caudal $1 \frac{1}{8}$ to $1 \frac{1}{3}$; pectoral $1 \frac{1}{3}$; ventral $1 \frac{7}{8}$ to $2 \frac{1}{10}$.

Color in alcohol largely dull uniform brownish, fins similar, and no distinct spots or markings. Length 42 to 250 mm. Three from Sydney.

Our examples agree with Günther's original account of Labrichthys gymnogenis, his example 249 mm. long. The coloration is described with a dark longitudinal anal band, not now evident in our material.

A drawing of one of our examples, by W. H. Dougal, made in January, 1849, shows many white spots on body, rather large and scattered irregularly. Also body dorsals and anals with subbasal deep brown bands, most distinct on rayed fins, and fin edges dark. There are no distinct scales shown on the cheek. This specimen apparently also figured in manuscript by Richard, though with a different pattern of white spots, and the row of cheek scales indicated, but with ten dorsal spines and lateral line 30, of which last 2 scales on caudal base. Another figure by Richard, dated 1858, from Sydney, refers to our largest example. It shows same lateral line as the preceding, 9 anal rays and 3 scales above lateral line to spinous dorsal origin. The scales are, however, shown with too fine striae.

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Labrichthys cyanotaenia Bleeker. *Fay.* 237-

Head 3; depth $3 \frac{1}{4}$; D. VIII, 12, 1; A. III, 10, 1; scales
20 in upper section of lateral line, 5 in longitudinal section

to caudal base and 3 more on latter; 5 scales above lateral line to spinous dorsal origin, 10 below to spinous anal origin; 34 predorsal scales; snout $3 \frac{1}{2}$ in head; eye $5 \frac{7}{8}$; maxillary 5; interorbital $3 \frac{1}{2}$.

Head width $2 \frac{4}{5}$ its length. Snout conic, long as wide. Lips broad, fleshy, not sharply defined, upper as thick as rounded lobe each side behind and both with fine concealed longitudinal striae. Interorbital convex. Preopercle edge concealed by squamation. Rakers about 10 short rudimentary points; filaments $1 \frac{1}{8}$ in eye. Squamation compact; head closely scaled, except first third of snout, preorbital and mandible to rictus; scales on lower surface fine and still finer over entire upper surface of head, also small scales on front suborbital and around eye; vertical fins all largely and closely scaled, only edges free, those on dorsal and anal lanceolate; basal radiating striae 38; body scales elongate, apical radiating striae 11, complete, radiating from scale center, and 12 accessory marginals.

Color in alcohol dark umber-brown, each row of scales with dark line or streak longitudinally at junctures of scales, also extending horizontally on head and others on vertical fins. Caudal brown, with broad submarginal dusky band sub-terminally. Ventral brownish, longest rays dusky. Length 127 mm. Samoa.

Trochocopus unicolor Günther. *Fig. 238.*

Head 3; depth $2 \frac{4}{5}$; D. XII, 10; A. III, 12; scales 50 in lateral line to caudal base and 3 more on latter; 11 scales above lateral line to spinous dorsal origin, 9 above to soft dorsal origin, 18 below to spinous anal origin; 18 predorsal scales; snout $2 \frac{1}{3}$ in head; eye 7; maxillary $2 \frac{2}{3}$; interorbital $3 \frac{1}{8}$.

Head width $2 \frac{2}{5}$ its length. Snout width, at front of eyes, about $1 \frac{1}{4}$ its length. Interorbital convex. Preopercle edge entire. Gill-opening forward to front eye edge. Cheek scales in 9 rows; breast scales small; 21 basal radiating striae; about 70 obscure apical striae continuous with fine circuli; rather small tubes in lateral line, slender, simple, though well exposed. Ends of dorsal spines all covered with thick skin, coriaceous. Color in alcohol dull uniform umber-brown. Teeth white. Length

463 mm. of example with trunk skinned out. Sydney. *Drawing by W. H. Dougal January 1847 and me by J. H. Richard.*
Epibulus insidiator (Pallas). *Fig. 239.*

Head $2 \frac{1}{2}$ to $2 \frac{3}{4}$; depth $2 \frac{2}{5}$ to $2 \frac{1}{2}$; D. IX, 10, 1; A. III, 8, 1; 14 or 14 scales in upper section of lateral line, 7 to 9 in lower median section to caudal base and 2 more scales on latter; 2 scales above lateral line to spinous dorsal origin; 1 or 2 above to soft dorsal origin, 5 or 6 below upper section of lateral line to spinous anal origin; 7 to 9 predorsal scales; snout 3 to $3 \frac{2}{5}$ in head from upper jaw tip; eye 4 to $7 \frac{1}{5}$; maxillary 2 to $2 \frac{2}{5}$; interorbital 4 to $4 \frac{1}{4}$; mandible 1 to $1 \frac{2}{7}$ in adult.

Body ovoid, well compressed; caudal peduncle length $2/3$ to $4/5$ its least depth, which $2 \frac{1}{6}$ to $2 \frac{4}{5}$ in total head. Head width $2 \frac{1}{3}$ to $2 \frac{3}{5}$ its length. Snout conic, upper profile concave, long as wide. Eye little elevated, hind edge midway in head length from snout tip, or slightly advanced with age. Mouth small, lower jaw slightly protrudes. Maxillary to pupil, in young, nearly opposite hind eye edge in adult. Teeth uniserial in jaws, 2 canines forward in each; lateral teeth following close set and form even cutting edge. Lips rather narrow, tough. Front nostril near middle in snout, hind one near last fourth. Interorbital convex.

Rakers ~~7~~ 13, lanceolate, $1 \frac{1}{2}$ in filaments, which 2 in eye. Scales large, in even longitudinal rows, narrowly imbricated, but little smaller along vertical fin bases, where forming broad sheaths 1 scale in width; 3 rows of scales on caudal, median very large or squamation over $2/3$ of fin in young; head covered with large scales, and 3 rows much enlarged between hind eye edge and hind opercle edge; subopercle and in teropercle scaly; snout naked, radiating striae 29 to 31 in young, much increased with age; apical striae 11 to 14 in young, 30 or more in adults, and only defined from basal as extending over pigmented area; circuli very fine; lateral line of simple slender tubes, some young with 2 or 3 short branches, entirely interrupted and extended in caudal base. First dorsal spine $4 \frac{1}{4}$ (young) to $7 \frac{3}{4}$ in head; last spine $2 \frac{1}{6}$ (young) to $3 \frac{1}{2}$; third anal spine $2 \frac{1}{8}$ (young) to

3 7/8; sixth anal ray 1 1/4 to 2 (young) where fin ends as point, but shorter than similar short anal point; seventh anal ray slightly longer than head, 2 1/5 in young, and extends beyond tip of median caudal rays; latter 1 2/5 (young) to 1 1/2; caudal convex behind in young, then truncate and finally concave or emarginate with age; pectoral 1 2/3 to 1 4/5; ventral 1 to 1 3/4., of which second and third rays subequally greatly longer than others in adults.

Color in alcohol largely uniform umber, scarcely paler below in young. Dark brown line from behind eye horizontally to hind opercle edge. Fins all brown, like body-color. Spinous dorsal with median pale horizontal band. Pectoral bordered behind and below with pale brown. In young caudal with narrow pale edge behind and submarginally broadly dark brown, also spinous dorsal with membranes terminally deep brown. Iris pale brownish. Young with lips pale edged. Length 63 to 295 mm. Three from Fiji and one from Samoa.

A painting by Drayton, dated June, 1840. Lebukia, Fiji, is colored hair-brown generally, above and below together with most of fins; buffy-brown tinge on side of head, with neutral-gray tints above and below; dusky line from near end of snout to eye, then over postocular to beginning of lateral line; each scale submarginally on trunk with narrow dark green line; obscure greenish tinge in middle of side and dull English-red tinge on back forward; bases of dorsals with dull yellowish-green tints; spinous dorsal back to tip of longest rays with

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terminal longitudinal band of meadow-
green, adjoining submarginal band
of ~~same~~ width of bitter sweet orange,
fin edge narrowly peach red, iris
scarlett, outer edge narrowly edged
ultramarine blue.

Also a sketch showing protracted
juv., by J. Drayton, with same data.
Drawing of young by J. H. Richard.

Wilkesella new genus.

Type. — Wilkesella bimaculata, new species.

Body deeply ovoid. Head small, pointed. Snout prominent, short though attenuated. Eye moderate. Mouth small, terminal. Lips rather small. Scales very large, especially on head and along base of dorsal and anal. Ventrals with small axillary scale. Lateral line prominent, interrupted. Spinous dorsal and anal each with marginal notch in membrane behind tip of spine. Soft vertical fins rounded. Paired fins short, rounded.

Small fishes, greatly resembling Cheilinus and to some extent Epibulus, but with greatly larger scales on the head.

We dedicate again a genus of fishes to Admiral Charles Wilkes.

Wilkesella binaculata, new species.

Fig. 239 a.

Head $2\frac{4}{5}$; depth $2\frac{3}{4}$; D. IX, 9, 5; A. III, 9; scales 15 in upper section of lateral line and 5 in lower section to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 6 below; snout $3\frac{3}{5}$ in head; eye $3\frac{2}{3}$.

Body deepest over end of pectorals. Least depth of caudal peduncle $1\frac{4}{5}$ in head. Head pointed, both profiles little concave forward. Snout long as eye. Mouth cleft reaches half way to eye. Jaws even. Interorbital scarcely elevated. Scales on head very large, 3 between eye and gill-opening and very large one, much greater than eye, on opercle. Scales on body all large and those along bases of dorsals greatly higher than along anal bases. Caudal base scaly, though scales not greatly enlarged. Tubercles in lateral line simple. Dorsal spines gradually higher to last. Anal spines slender, second little longer than third. Pectoral $1\frac{1}{3}$ in head and ventral little smaller.

Coloration largely uniform. Faint-

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verse white band across front of
caudal peduncle, 2 scales wide.
Black blotch at anterior soft dorsal
ray and another at same of anal
fin, each blotch little longer though
narrower than eye.

Described from a drawing, made
by J. H. Richard in 1858, of an
exemplar secured at Fiji.

terminal longitudinal band of meadow-green adjoining submarginal-band of same width of bitter-sweet orange, fin edge

narrowly peach red; iris scarlet, outer edge narrowly edged ultra-marine-blue.

Also sketch showing protruded fins, by D. J. H. Richard.
~~finer, by D. J. H. Richard, with same data. Drawing of young.~~

Hemigymnus melapterus (Bloch).

Fig. 240.

Head $2 \frac{3}{4}$ to $2 \frac{4}{5}$; depth $2 \frac{1}{3}$ to $2 \frac{1}{2}$; D. IX, 11, 1;

A. III, 10, or 11, 1; tubular scales 26 in lateral line to

caudal base and 2 or 3 more on latter; 5 scales above lateral

line to spinous dorsal origin, 4 above to soft dorsal origin;

and 10 or 11 below to spinous anal origin; 14 to 17 predorsal

scales; snout $2 \frac{2}{5}$ to $2 \frac{4}{5}$ in head; eye 4 to $4 \frac{4}{5}$; maxillary

$3 \frac{1}{2}$ to 4; interorbital $3 \frac{4}{5}$ to 4; head width $2 \frac{2}{5}$ to $2 \frac{1}{2}$.

Snout compressed, conic, width $1 \frac{1}{4}$ to $1 \frac{1}{3}$ its length. Rakers

9+16, lanceolate, equal filaments or $2 \frac{2}{3}$ in eye. Scales with

basal radiating striae 12; apical 11 to 13. Color in alcohol

bister; lower surface of head paler than upper; pale or clay

colored band from spinous dorsal down below lateral line, ex-

panding below to include most of abdomen; iris pale brown; dor-

sals and anals bister, edges of rayed fins rather broadly pale

and submarginal deep slaty band, edges of which narrowly blackish;

caudal brown, paired fins paler. Length 65 to 122 mm. One from

"Hilo or Fiji" and 2 without locality likely Hawaiian or Samoan?

Anampses cuvier Quoy and Gaimard.

Fig. 241 and 242.

Head $2 \frac{4}{5}$; depth 3; D. IX, 12, 1; A. III, 12, 1; tubular

scales 26 in lateral line to caudal base and 2 more on latter;

6 scales above lateral line to spinous dorsal origin, 3 above to soft dorsal origin; 13 predorsal scales; snout $3 \frac{1}{10}$ in head; eye $4 \frac{2}{3}$; maxillary $4 \frac{1}{4}$; interorbital $4 \frac{1}{8}$; head width $2 \frac{2}{5}$. Snout conic, width $1 \frac{1}{5}$ its length. Rakers 5-9, about 3 in filaments, which $1 \frac{2}{3}$ in eye. Scales with 23 basal radiating striae, apical 52. Color in alcohol faded dull brownish, head paler; each scale with pale streaks or spots medially, forming even longitudinal rows, which narrow and smaller on smaller scales; dorsals with 2 rows of longitudinal pale spots, which close-set, large basal, and also over rayed fin additional 2 parallel similar rows; anal with 3 longitudinal pale bands, basal broadest; fine dots in head above of white, below pale with close-set large eye. Length 103 to 188 mm. One from the Hawaiian Islands. We also include 2 dry skins in the Academy, same locality, collected by J. K. Townsend.

Anampses caeruleopunctatus Rüppell. *Fig. 243.*

Head $2 \frac{4}{8}$; depth $2 \frac{1}{2}$; D. IX, 12, 1; A. III, 12, 1; scales 25 in lateral line to caudal base and one more tabular on latter; 7 scales above lateral line to spinous dorsal origin; 5 above to soft dorsal origin, 11 below to spinous anal origin; 7 predorsal scales to occiput medially; snout $2 \frac{4}{5}$ in head; eye $7 \frac{3}{4}$; maxillary $4 \frac{1}{4}$; interorbital $3 \frac{2}{5}$.

Body elongate ovoid, compressed; caudal peduncle length $\frac{2}{3}$ least depth, which $2 \frac{1}{4}$ in head. Head width $2 \frac{1}{4}$ its length. Snout compressed, width $1 \frac{1}{6}$ its length. Eye small, elevated, hind edge slightly before middle in head length. Mouth small, jaws equal. Maxillary half way to eye, largely concealed. Two large flat incisors protrude forward from front of each jaw, upper pair more distant, broader and with oblique edges. Lips leathery, rather thin. Nostrils small, well separated, front one close behind last third in snout and hind one midway between front one and eye. Interorbital convex. Preorbital, suborbitals, preopercle flange and opercles all with fine radiating striae; edges of preopercle behind and below membranous; opercular flap from edge of body opercle wide as eye.

Rakers $7+12$, short, lanceolate, robust, $2 \frac{1}{8}$ in filaments, which equal eye. Head naked; predorsal and breast with small scales on both regions smallest forward; vertical fins scaleless; basal $\frac{2}{5}$ of caudal with small scales; basal radiating striae 20 and about 70 or more imperfect radiating apical striae, which not continuous with very fine circuli; lateral line complete, slopes largely with profile of back, drops midway along slender caudal peduncle side; slender tubes well exposed, simple, or branches few or rudimentary. First dorsal spine $4 \frac{1}{2}$ in head; last spine $3 \frac{1}{8}$; first dorsal ray $2 \frac{2}{3}$; third anal spine $4 \frac{2}{5}$; first anal ray 3; caudal truncate, convex, behind when expanded, $1 \frac{2}{3}$; pectoral $1 \frac{2}{5}$; ventral $2 \frac{1}{8}$.

(609)

Color in alcohol largely dull brownish generally. Each scale with small pale or whitish spot medially, edged with dusky, which is more imbricated costal scales form short vertical bars. Often those on abdomen more horizontal and on breast some resolve into streaks, which region largely pale bluish. Several faint bluish lines on head, mostly radiating from eye, and one down preopercle flange. Dorsals brown, with minute pale spots, except submarginally, where dark or brown line, and fin edge pale. Anals with pale edge, dark submarginal line, median and basal pale bluish line bordered with deep brown. Caudal covered with pale spots of moderate size, edge behind narrowly pale. Pectoral and ventral uniform dull brown. Iris brown.

blue; pectoral pale yellow and
rest of the color
pale bluish color. All the rest of the color
red-brown purple brown, lighter on side of
head. 129, 134, 40.

Length 265 mm. One from Hulls Group. *Drayton's color sketch shows the ventral and belly red, the light markings on the body.*

The two Hawaiian examples, which we have examined in the Academy, recorded by Fowler as Anampses coeruleopunctatris²¹¹ are faded and poorly preserved, and are certainly Macropharyngodon geoffroy (Quoy and Gaimard).

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Proc. Acad. Nat. Sci. Phila., 1900, p. 506.

Anampses geographicus Valenciennes. *Fig. 244-*

Head $2 \frac{4}{5}$; depth $2 \frac{4}{5}$; D. IX, 12, i; A. III, 12; scales 50 in lateral line to caudal base and 2 more on latter; 9 scales above lateral line to spinous dorsal origin, 8 above to soft dorsal origin, 20 below to anal origin; 12 predorsal scales to occiput medianly; snout $2 \frac{5}{6}$ in head, from snout tip; eye 7; maxillary $4 \frac{1}{5}$; interorbital $3 \frac{1}{2}$. Body greatly compressed;

caudal peduncle length $3/5$ its least depth, which $2 \frac{2}{5}$ in head. Head width $2 \frac{1}{8}$ its length. Snout compressed, width $1 \frac{1}{4}$ its length. Rakers 6-12, lanceolate, short, half of filaments, which equal eye. Scales small, still smaller on body edges; also small scales on basal third of caudal; 15 or 16 radiating marginal basal striae and 16 to 30 apically marginal, all joining median reticulations; tubes mostly simple or few bifid, slender, well exposed.

Color in alcohol chocolate-brown generally, each scale on trunk with an obscure pale round spot. Head ventral brownish, with number of paler variably narrow streaks, most radiating backward and forward, with latter broader and emphasized by narrow dusky borders formed as lines; upper one forward from eye widest and crosses interorbital to opposite eye; lower streak horizontally forward, forks, with one section toward middle of maxillary and hind section toward its end behind, but both joining similar streak extending completely around snout edge; several pale lines extend along lower side of head, over breast and chest. Dorsals, anals and caudal dark, like body color, but edged pale or dull brownish medianly in caudal; rather few pale spots, small bars or short variable lines on ventral fins, mostly basally, also edges of pale borders with narrow darker separating line. Pectoral and ventral dull brown, latter with front edge narrowly and 1 or 2 parallel irregular lines of pale or grayish. Length 192 mm. Pomoton.

This species does not appear to have been recorded from Polynesia, being previously known from Amboyna and Ceram. Our specimen shows a very similar color-pattern to Bleeker's ²¹²figure. It differs in a few minor points, however, as the absence of the white line extending up from the upper ^{eye} edge. Our example has hind caudal edge concave, with upper and lower points distinct, though when greatly expanded, as Bleeker shows, the hind edge becomes convex. It also lacks the connecting membrane to the uppermost ventral ray, as indicated by Bleeker.

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Atlas Ichth., vol. I, 186, Pl. 25, fig. 3.

Stethojulis albobittata (Koebreuter). *Fig. 245.*

Head 3; depth $2 \frac{2}{3}$; D. IX, 11, 1; A. II, 11, 1; scales 25 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 9 below to spinous anal origin; 6 predorsal scales; snout $2 \frac{7}{8}$ in head; eye $5 \frac{3}{5}$; maxillary 4; interorbital $4 \frac{1}{8}$; head width $2 \frac{1}{5}$. Snout conic, width $1 \frac{1}{6}$ its length. Rakers 7+4 short points, 4 in filaments, latter $1 \frac{1}{6}$ in eye. Scales with basal radiating striae 13 or 14, apical 10 to 13. Color in alcohol back olive-brown, lower half of body paler. Pale lines on head and trunk pale brown, edged darker. Head chocolate-brown, lower lip and wider surface pale. Iris dull yellowish brown. Area just before pectoral origin chocolate-brown like head. Each scale on back

with slightly darker basal blotch. Unpaired fins all pale or yellowish-brown and paired fins pale olive-brown. Length 115 mm. Maui.

This species is best figured from Morita's drawing by Jordan and Evermann. The subsequent figure by Günther is quite crude²¹³. It shows 31 scales in lateral line. All these writers as well as Richard's manuscript figure fail to indicate the last tubular scale in lateral line larger than any of the preceding scales, as the specimen before us shows.

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, Pl. 141, fig. B.

Stethojulis axillaris (Quoy and Gaimard). *Fig. 246.*

Head $2 \frac{7}{8}$ to $3 \frac{1}{4}$; depth $2 \frac{2}{3}$ to $2 \frac{5}{6}$; D. IX, once VIII, 11, 1; A. III, few II, 11, 1; scales 24 or 25 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin, 9 below to spinous anal origin; 7 to 9 predorsal scales; snout $2 \frac{7}{8}$ to $3 \frac{1}{4}$ in head; eye 4 to 5; maxillary $3 \frac{4}{5}$ to 4; interorbital $3 \frac{3}{5}$ to $4 \frac{1}{5}$; head width $2 \frac{1}{8}$ to $2 \frac{1}{4}$. Snout conic, width $1 \frac{1}{8}$ to $1 \frac{1}{3}$ its length. Rakers 9 14, short points, 4 in filaments and latter $1 \frac{1}{8}$ in eye. Scales with basal radiating striae 12 to 15, apical 10 to 17. Color in alcohol faded umber-brown, paler to olive-buff below, though with base of each scale darker or like back. Entire upper surface of head and back with very fine crowded gray specks or dots. In lateral line at bases of last 2 scales before caudal base, at base of each small black ocellus about half

Stellogulus strigiventer (Bennett) Fig. 246a.

Drawing of an example by Richard
in 1858. Specimen from Fayataba.

of pupil in diameter and second usually larger. On side of trunk posterior to pectoral each row of scales with slightly darker median spot which produces obscure longitudinal series or bands. Fins all pale brown. White blotch above pectoral origin. Length 68 to 122 mm. Eight from Oahu and Maui and two from Fiji.

"Günther figures a very pale Pelew example²¹⁴ with a black basal band to pectoral, scales in lateral line 32 and soft dorsal rays 12.

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Journ. Mus. Godeffroy, vol.17, heft 7, 1881, p. 254, Pl. 136, fig. C.

Halichoeres guttatus (Bloch). *Fig. 247.*

Head 3; depth $3 \frac{1}{10}$; D. ~~IX~~, 12; A. 12, 1; scales 26 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, and 9 below to anal origin; 12 predorsal scales; snout $3 \frac{1}{8}$ in head from upper jaw tip; eye $3 \frac{3}{4}$; maxillary 4; interorbital $4 \frac{1}{8}$.

Body elongate ovate, strongly compressed; caudal peduncle length $1 \frac{1}{4}$ its least depth, latter $2 \frac{1}{8}$ in head. Head width $2 \frac{2}{3}$ in its length. Snout conic, width $1 \frac{1}{5}$ its length. Eye elevated, hind edge about midway in head length. Mouth moderate, jaws even. Maxillary to hind nostril, mostly concealed. Teeth uniserial, pair of canines in front of each jaw, lower fitting

in between upper pair; other teeth gradually smaller backward. Maxillary with strong forward directed canine, projecting when closed. Front nostril about last fifth in snout, hind one close behind, little larger. Interorbital convex. Preopercle edge adnate. Rakers $5 + 7$, lanceolate, 5 in filaments, latter $1 \frac{1}{2}$ in eye. Scales smaller on predorsal and breast; small scales on caudal basally $\frac{1}{3}$ its extent; fins scaleless; basal radiating striae 26, apical 17; circuli fine; lateral line concurrent with dorsal profile, falls below last few dorsal rays midway along caudal peduncle side; tubes slender, simple, most front ones with small branch. First dorsal spine 4 in head; last spine $2 \frac{1}{2}$; first dorsal ray $2 \frac{2}{5}$; second anal spine $3 \frac{1}{2}$; first anal ray $2 \frac{1}{4}$; caudal $1 \frac{1}{3}$; convex behind; pectoral $1 \frac{2}{3}$; ventral $2 \frac{1}{8}$.

Color in alcohol faded dull brownish generally; dark line from snout tip laterally to eye, then back to opercle, but not on flap, and curved downward behind, branch extending along preopercle edge. Dark bar behind eye. Each scale on trunk below lateral line with pale spot forming longitudinal lines. Above lateral line scales largely dark. Two rows of round pale spots on dorsals, and on soft fin additional submarginal series of smaller ones, also submarginal dark line on soft dorsal. Anal like soft dorsa. Caudal pale basally, broadly dusky terminally. Other fins pale brownish. Length 75 mm. One without locality,

Drawing by J. H. Richard given Fiji.

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~~Likely from the Philippines?~~

Weber's figure²¹⁵ of a typical example agrees in most respects.

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Sibogha Exped., Fische, 1913, p. 374, fig. A. Sitoli, Nias.

Halichoeres ornatissimus (Garrett). *Fig. 248*

Head $3 \frac{1}{8}$ to $3 \frac{1}{2}$; depth 3 to $3 \frac{1}{8}$; D. IX, 12, i; A. II, 12, i; scales 26 or 27 in lateral line to caudal base and 1 more on latter; 5 scales above lateral line to spinous dorsal origin; 2 or 3 to soft dorsal origin, and 11 or 12 below to spinous anal origin; snout 3 to $3 \frac{1}{8}$ in head; eye $4 \frac{2}{3}$ to $5 \frac{1}{8}$; maxillary head width $2 \frac{1}{3}$ to $2 \frac{2}{5}$. Snout conic, long as wide. Rakers 5-6, short points, about 4 in filaments, which $1 \frac{1}{3}$ in eye. Scales with basal radiating striae 26 to 36, apical 26 to 41. Color in alcohol largely dull brownish, with vertical white bar at each scale base and hind scale edge with dark line. Pale horizontal lines on head all grayish. Front edge of pale band before pectoral base dark and contrasted, also with pale blotch anterior and little low. Hind white caudal edge very narrow. Length 103 to 115 mm. Two from Oahu.

Gunther has used Garrett's figure, and mentions he has not seen any specimens. In his diagnosis he gives the scales as 27 while Garrett's figure shows at least 32. It also shows 3 anal spines, but lacks the characteristic dark preorbital spot.

Halichoeres lao Jenkins²¹⁶ is certainly very close to judge from the original account and figure, and may be simply a variant. The only distinction is exhibited in its color, though the presence of the 2 black blotches on the soft dorsal is no less remarkable

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than in certain other species; It was founded on a single example 127 mm long.

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Bull. U.S.Fish.Comm., vol.19,1900, p. 48, fig. 3.

Halichoeres trimaculatus (Quoy and Gaimard).

Head $2 \frac{7}{8}$ to 3; depth $3 \frac{1}{5}$ to $3 \frac{3}{5}$; D. IX, 11; A. III, 11; scales 24 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, and 8 or 9 below to spinous anal origin; 8 or 9 predorsal scales; snout $3 \frac{1}{4}$ to $3 \frac{1}{2}$ in head; eye $3 \frac{1}{8}$ to $3 \frac{1}{2}$; maxillary $3 \frac{1}{2}$ to 4; interorbital $4 \frac{2}{3}$ to 5; head width $2 \frac{2}{3}$. Snout conic, width $1 \frac{1}{4}$ its length. Scales with 22 to 25 basal radiating striae and 12 to 14 apical. Color in alcohol largely faded dull brown, little paler below; Few scales on sides of abdomen each with trace of slightly brown small round spot. Small blackish spot at pectoral origin. Faint traces of pupil to caudal base near upper edge of caudal peduncle. Length 48 to 53 mm. One from Fiji, and another labeled "Samoa or Fiji".

We have compared a series of Samoan examples of all ages, in the Academy, which in every way agree.

Halichoeres poeyi (Steindachner). *Fig. 749.*

Head $3 \frac{1}{4}$; depth $3 \frac{2}{5}$; D. IX, 10, 1; A. II, 11, 1; scales 27 in lateral line to caudal base and 3 more on latter; 3 scales above lateral line to spinous dorsal origin; and 8 below to spinous anal origin; 7 predorsal scales; snout $2 \frac{1}{2}$

in head; eye $6 \frac{2}{3}$; maxillary $3 \frac{4}{5}$; interorbital $5 \frac{1}{2}$; head width $2 \frac{2}{5}$. Snout conic, width $1 \frac{1}{4}$ its length. Rakers 6+12, short points, 4 in filaments, latter $1 \frac{1}{3}$ in eye. Scales with 50 to 54 basal radiating striae, 33 to 42 apical, median connecting reticulations rather imperfect; tubes in lateral line simple to 5-branched. Color in alcohol faded dark dusky-olive, little paler or more olive below. Traces of 3 slightly paler brownish horizontal bars on opercle, uppermost level with lower eye edge and median, opposite rictus. Length 184 mm. Rio Janeiro.

We have compared slightly smaller examples in the Academy from St. Lucia and Trinidad, West Indies. No trace of the dark blotch behind the eye and dark bar at pectoral basally now in the Rio Janeiro example, West Indian examples show 43 basal striae on scales, and 29 apical. We follow Gilbert in uniting Iridio kirschii Jordan and Evermann as a synonym of this species²¹⁷.

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Proc. Wash. Acad., vol. 2, 1900, p. 173. Pernambuco.

Halichoeres opercularis (Günther) Fig.
Drawing of an example from Fiji, by
J. Richardson in 1858.

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Macropharyngodon geoffroy (Gray and Vainard)
Fig. 2494

Drawing of example from house by
Richard.

gaimard Quoy and Gaimard. Fig. 250.

Julis pulcherrima (Gunther).

Head $3 \frac{1}{6}$ to $3 \frac{1}{3}$; depth $3 \frac{1}{5}$ to $3 \frac{1}{2}$; D. IX, 12, 1; A. III, 12, 1; scales 67 in lateral line to caudal base and 4 more on latter; 10 scales above lateral line to spinous dorsal origin, 6 above to soft dorsal origin, 28 below to spinous anal origin; 22 predorsal scales; snout 3 to $3 \frac{1}{4}$ in head; eye $6 \frac{1}{8}$ to $6 \frac{2}{5}$; maxillary $3 \frac{1}{3}$ to $3 \frac{4}{5}$; inter-bital 4 to $4 \frac{1}{5}$.

Body strongly compressed; caudal peduncle length $1 \frac{3}{4}$ to $1 \frac{7}{8}$ its least depth, which $1 \frac{4}{5}$ to 2 in head. Head width $2 \frac{1}{4}$ to $2 \frac{2}{5}$ its length. Snout conic, long as wide. Maxillary to eye, to hind nostril in smaller examples; largely concealed behind. Interorbital convex. Preopercle edge rather firm, membranous. Rakers 7 12, short, lanceolate, rather flexible, 2 in filaments, which $1 \frac{4}{5}$ in eye. Scales on predorsal and breast forward smaller, also on belly below and on caudal base; basal radiating striae 17 to 22; about 16 imperfect apical striae, more or less confluent with very fine circuli; lateral line complete, slopes abruptly after eighth dorsal ray until midway in body depth, then horizontal to caudal base medially; tubes in lateral line moderate, simple, each expanded at pore. First dorsal spine $1 \frac{1}{6}$ to $1 \frac{2}{5}$ in head, last $3 \frac{1}{8}$ to $2 \frac{1}{4}$; first dorsal ray $2 \frac{1}{8}$ to $2 \frac{1}{3}$; third anal spine $3 \frac{2}{5}$ to $3 \frac{4}{5}$; first anal ray $2 \frac{2}{5}$ to $2 \frac{3}{5}$; caudal rounded behind, $1 \frac{1}{3}$; pectoral $1 \frac{2}{5}$; ventral $1 \frac{1}{8}$ to $1 \frac{2}{5}$.

Color in alcohol with head and body largely deep chocolate-brown. Trunk with many pale blue spots, crowded on caudal peduncle, more so on scales at caudal base, also few extending on bases of dorsals and anals. Latter, both, with narrow dusky marginal line, with pale submarginal streak to bluish spots like those on trunk. Other fins all pale yellowish in fresh material. Front ventral edge brownish. Deep brown line from upper hind^{eye} edge toward spinous dorsal origin. Broad pale band from side of snout tip to eye and back behind eye to middle of opercle. Another pale arched band curves forward to mouth corners and back to before pectoral base; also dark line from upper front eye edge toward snout tip and median brown streak, which may be broken in places along predorsal region nearly to snout end. Iris pale brown. Length 193 to 212 mm. Fiji. We also include 3 Hawaiian examples, examined in the Academy.

Coris ballieni Vaillant and Sauvage.

Figs. 251 and 252.

Head $3 \frac{1}{3}$ to $3 \frac{2}{5}$; depth $3 \frac{1}{8}$ to $3 \frac{1}{3}$; D. IX, 12, i, once 11, i; A. III, 12, i; scales 53, once 52, in lateral line to caudal base and one more tabular on latter; 7 or 8 scales between spinous dorsal origin and lateral line, 4 to soft dorsal origin, and 18 or 19 below to spinous anal origin; 14 or 15 predorsal scales; snout $2 \frac{3}{4}$ to $3 \frac{1}{5}$ in head from upper jaw tip; eye $5 \frac{1}{5}$ to 7; maxillary $3 \frac{5}{6}$ to $4 \frac{2}{3}$; interorbital $4 \frac{1}{4}$ to 5.

Body strongly compressed; caudal peduncle length $\frac{2}{3}$ to $\frac{4}{5}$ its least depth, which $2 \frac{1}{3}$ to $2 \frac{2}{5}$ in total head length. Head width $2 \frac{1}{4}$ to $2 \frac{2}{5}$ its length. Snout compressed, width $1 \frac{1}{6}$ to $1 \frac{1}{4}$ its length. Mouth small, jaws even or lower jaw slightly protrudes. Interorbital convexly elevated. Preopercle edge membranous; bones of head all smooth; opercular flap $1 \frac{4}{5}$ to $2 \frac{1}{5}$ in snout. Rakers 5 and 7 + 10 to 13, short lanceolate, robust, 2 in filaments which $1 \frac{1}{6}$ in eye. Predorsal and breast with small scales, on both regions smaller anteriorly and predorsal with narrow naked median strip its entire extent; basal radiating striae 37 to 67, apical imperfect and some continuous with very fine circuli, more distinct in young; simple tubes in lateral line slender, each slightly expanded at terminal pore. First dorsal spine $1 + 1 \frac{1}{7}$ to $1 + 1 \frac{1}{3}$ in total head, 2 to $3 \frac{1}{4}$ in young or female, reaches well beyond pectoral tip or even to second dorsal origin in male and with filamentous end; other spines pungent, last $2 \frac{1}{2}$ to $3 \frac{1}{8}$; first dorsal ray $2 \frac{1}{8}$ to

2 $\frac{1}{4}$; third anal spine 3 $\frac{3}{4}$ to 4 $\frac{2}{5}$; first anal ray 2 $\frac{1}{4}$ to 2 $\frac{1}{3}$; caudal convex behind, 1 $\frac{2}{5}$ to 1 $\frac{3}{5}$; pectoral 1 $\frac{2}{5}$ to 1 $\frac{3}{5}$; ventral 1 $\frac{1}{4}$ to 1 $\frac{2}{3}$.

Color in alcohol largely olive-brown, paler below. About 15 longitudinal dark bands, 2 of which above lateral line, those on costal region narrower and sometimes joining others; bands not entirely parallel with courses of scales, except in few cases. Paler areas of intervening bands mostly with pale bluish-gray spots, often one to a scale. Head mostly deep brown forward. Grayish band from below front eye edge to mouth corner; another from mouth angle across lower preopercle flange and interopercle; also 4 or 5 other broad grayish bands, spots or blotches down across cheek and front of opercle. Iris pale brown. Dorsals brown, with 5 or 6 longitudinal fine deeper brownish lines, slightly waved, and black blotch little smaller than pupil on basal part of first membrane. Anals pale brownish, with similar lines, only oblique and pale; in smaller examples these lines fewer or less crowded, also coarser. Caudal brown, with about 5 transverse slightly waved grayish bands on scaleless portion of fin, edged narrowly with deeper tint. Pectoral and ventral uniform dull brown. Length 184 to 315 mm. Two from Maui.

We also include 2 Hawaiian examples, examined in the Academy, one of which is representative of the nominal Coris rosea Vaillant and Sauvage. Although our material does not certainly

reveal the sexes, owing to its long preservation in alcohol, besides sometimes the viscera are damaged, we feel that the characters advanced by Jordan and Evermann for their C. rosea may very readily be assigned to sexual or immature conditions. Thus the less produced first dorsal spine and the larger eye are especially pertinent. Although our large example of C. rosea is much faded, it had precisely the color-markings on the head, according to such traces as remain, as in the undoubted examples of C. baillieni. It therefore would follow that C. argenteo-striatus Steindachner and Hemicoris keleipionis Jenkins are other synonyms. These suggestions were written sometime before we noticed Gunther's idea that C. rosea is likely the female.²¹⁸

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 276.

Coris venusta Vaillant and Sauvage.

Fig. 253 and 254.

Head $3 \frac{1}{6}$ to $3 \frac{1}{2}$; depth $3 \frac{1}{2}$ to $3 \frac{2}{3}$; D. IX, 12, 1; A. III, 12, i; scales 49 or 50 in lateral line to caudal base and 2 more on latter; 4 or 5 scales above lateral line to spinous dorsal origin. 3 or 4 to soft dorsal origin, and 16 to 18 below to spinous anal origin; 12 predorsal scales; snout $3 \frac{1}{8}$ to $3 \frac{1}{3}$ in head; eye $5 \frac{1}{5}$ to 6; maxillary $4 \frac{1}{4}$ to $4 \frac{1}{2}$; interorbital $4 \frac{4}{5}$ to 5.

Body strongly compressed; caudal peduncle length $\frac{2}{3}$ to $\frac{3}{4}$ its least depth, which 2 to $3 \frac{1}{2}$ in head. Head width $2 \frac{1}{8}$

its length. Snout conic, compressed, width $1 \frac{1}{6}$ its length. At last one pair of teeth enlarged as canines, sometimes one on both, or only 1 - one side, may also be lesser enlarged, in front of each jaw; front above inside may have 4 short rows of several smaller similar teeth to laterals, several to each row inside; maxillary with or without single small canine above posteriorly. Lips moderate, rather thin, each with several longitudinal folds. Interorbital convexly elevated. Preopercle edge membranous. Rakers 7+9, short, lanceolate, robust, $1 \frac{1}{2}$ in filaments which $1 \frac{1}{2}$ in eye. Predorsal and breast with small scales, on both regions smallest forward; no naked predorsal strip, scales passing completely over; basal third of caudal with small scales; basal radiating striae 35 to 43, apical 30 to 35, imperfect and mostly continuous with five circuli; lateral line slopes abruptly after eighth dorsal ray until midway in body depth, then horizontal; simple tubes slender, each slightly expanded at terminal pore. First dorsal spine 4 to $4 \frac{2}{3}$ in head; last spine $2 \frac{7}{8}$ to 3; first dorsal ray 2 to $2 \frac{1}{4}$; third anal spine $3 \frac{1}{2}$ to $3 \frac{3}{4}$; first anal ray $2 \frac{1}{6}$ to $2 \frac{1}{3}$; caudal $1 \frac{1}{5}$ to $1 \frac{1}{3}$; pectoral $1 \frac{1}{3}$ to $1 \frac{1}{2}$; ventral $1 \frac{1}{5}$ to $1 \frac{1}{4}$.

Color in alcohol deep brown generally. Head with 4 broad, more or less curved longitudinal pale leaden or bluish bands; lowest along lower preopercle edge; next from mouth corner close toward eye and then down toward prepectoral region; another from snout side to eye, then from behind eye curving

down toward pectoral origin; finally uppermost along each side of head above, broken at blotch each side above and behind eye; bands all with more or less slightly darker marginal lines, or sometimes absent. Hind edge of opercle flap pale, with narrow submarginal blackish crescent, which may extend variously above and below as submarginal dark line. Narrow brown lines extend back on trunk as pale brownish streaks, which fade out about opposite soft dorsal and anal. Scales on trunk all more or less finely, though obscurely mottled with darker. Spinous dorsal with moderately wide band of leaden bluish and submarginally narrow pale brownish streak, which gives place on soft dorsal to rather narrow close pale bluish-gray lines sloping down behind, forking or with narrow intervening similar lines on submarginal portion of fin. Anals pale, with row of pale brownish spots basally, one behind each ray, median and submarginal line also at last rays to similar pattern on last dorsal rays. Caudal finely barred with similar transverse lines, which closer terminally on fin. Pectorals and ventrals, also pale brownish.

Formaline specimens show brownish markings as pale yellowish-brown, also streaks back on fore part of trunk, all of paired fins and marginal portions of vertical fins. Slight variation in all our examples is noticed in the color-pattern, in which bands may be broken in places, narrower, more extensive, etc.

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Length 155 to 160 mm. Maui. We also include 4 examples in the Academy from Honolulu.

Halichoeres multicolor Rüppell²¹⁹ would differ greatly in color-pattern, if the original figure is correct. The soft dorsal and anal do not show the fine obliquely transverse lines of our examples.

Coris dorsomacula Fowler²²⁰ is doubtless a variation, and therefore a synonym. By omission it is said to have "scales 5 in lateral line to base of caudal and 4 more on latter", whereas the figure shows 53 to caudal base and 4 more on latter. We find on the type 50 to caudal base and 2 more on latter on left side, the other number apparently referring to the right side. The black blotch at bases of last 2 dorsal rays and well over fin basally is not shown on the figure.

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Neue Wirbelth., Fisch., 1838, p. 15, Pl. 4, fig. 3

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Proc. Acad. Nat. Sci. Phila., 1907, p. 436, fig. 8. Victoria, Australia.

Fowler also wrongly recorded 3 examples in the Academy, Nos. 9,331 to 9,332 and "17,207" (last erroneous as 17,205 was intended), as Coris aygula Lacépède²²¹ from the Hawaiian Islands, all collected by J.K. Townsend. These were prepared as 2 alcoholics and a dried skin, the right half only, respectively. Unfortunately the first 2 have since spoiled and cannot be used for study. However, as a description was given, which

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Proc. Acad. Nat. Sci. Phila., 1900, p. 510.

agrees in every way with the present species when allowance is made for the preservation of the specimens, there is little doubt that they are Coris venusta. The dried skin before us, is about the same size as the alcoholics, or 113 mm. long, and agrees in every way when proportion for shrinkage is estimated. Thus the head shows $4 \frac{1}{2}$ in the total length or about $3 \frac{7}{8}$ without caudal; depth $6 \frac{1}{2}$ in total or $5 \frac{1}{5}$ without caudal; snout $3 \frac{1}{5}$ in head; eye 5; maxillary $4 \frac{1}{4}$. Though faded very faint traces of the characteristic color-pattern may be distinguished. The examination of these specimens in this connection is of importance in finally erasing C. dygula from Hawaii.

Julis flavoittatus (Bennett). *Figs. 255 and 256.*

Head $3 \frac{1}{4}$ to $3 \frac{1}{3}$; depth $3 \frac{1}{4}$ to $3 \frac{3}{4}$; D. IX, 12, 1; A III, 12, 1; scales 80 to 83 in lateral line to caudal base and 2 or 3 more, tubular, on latter; 9 or 10 scales above; lateral line to spinous dorsal origin, 6 or 7 above to soft dorsal origin, and 35 or 36 below to spinous anal origin; 24 to 27 predorsal scales; snout 3 to $3 \frac{1}{3}$ in head; eye $4 \frac{3}{5}$ to $7 \frac{3}{4}$; maxillary $3 \frac{4}{5}$ to 4; interorbital $4 \frac{1}{4}$ to 5.

Body strongly compressed; caudal peduncle length $1 \frac{1}{2}$ to $1 \frac{4}{5}$ its least depth, which $1 \frac{3}{4}$ to 2 in head. Head width $2 \frac{1}{2}$ to $2 \frac{3}{5}$ in its length. Snout conic, width $1 \frac{1}{6}$ to $1 \frac{2}{5}$ its length. Interorbital convex. Preopercle edge firm, membranous; bones of head smooth; opercular flap $1 \frac{5}{6}$ to 2 in snout. Rakers 5 12, short, lanceolate, rather flexible, $1 \frac{3}{4}$

in filaments , which $1 \frac{1}{4}$ in eye. Scales on predorsal and breast smaller forward, also a belly below and on caudal base, extended nearly half way over latter fin; predorsal entirely scaled; scales with basal radiating striae 10(young) to 23, and 18 (young) to 34 more imperfect radiating apically, which largely continuos with very fine circuli; tubes in lateral line moderate, each little expanded at pore. First dorsal spine 3 to $3 \frac{2}{3}$ in head; last spine $2 \frac{2}{5}$ to $2 \frac{3}{4}$; first dorsal ray 2 to $2 \frac{1}{8}$; third anal spine $3 \frac{1}{5}$ to $3 \frac{1}{4}$; first anal ray $2 \frac{1}{5}$ to $2 \frac{1}{4}$; caudal $1 \frac{1}{3}$ to $1 \frac{1}{2}$, hind edge convex; pectoral $1 \frac{3}{4}$ to $1 \frac{3}{4}$; ventral $1 \frac{9}{10}$ to $2 \frac{1}{8}$.

Color in alcohol pale brownish generally. Brown band begins on side of snout, continues from eye above opercle flap, then broadens and darkens blackish-brown to end at middle of upper half of caudal basally within squamous area of fin. On snout above; just before nostrils, another similar parallel band entirely above eye, its width on trunk half of lower band's width and fuses with latter just middle of soft dorsal. Dark blotch at end of opercular flap, rounded, half eye in size. Behind and above eye dark band gives off still narrower one extended each side of predorsal and narrowly along each side of bases of dorsals to upper edge of caudal peduncle, finally resolves into wide submarginal band parallel with hind caudal edge, though greatly widened on middle of caudal. Dorsals blackish-brown, margin narrowly whitish; black ocellus on upper half of second dorsal spine and broad median pale yellowish area entire length

of both fins. Anals blackish brown, edge narrowly whitish. Pectoral, ventral and caudal, other than noted, pale brownish.

In young dark brown upper band extends below until narrow whitish line separates it along entire median axis of body. Also another pale line from lower part of cheek extending back below pectoral base and thence along lower surface exactly similar, though reversed, to uppermost pale dividing dorsal line. It likewise extends out and encloses a similar dark blotch on lower half of caudal basally. Also traces of still lower pale line along lower side of abdomen and just above ventral base, then back indistinctly along most of forward base of anal. Pale band below and forward to eye, quite broad including most of preorbital region. All dark bands on head entirely separated by median pale line. Length 98 to 330 mm. One from Hilo, one from Maui and 2 from Oahu. We also included 2 Hawaiian examples in the Academy.

A painting by J. Drayton gives Hilo Bay, caught by natives in net, January 23, 1841. Its back and head above blackish-brown, brick-red tinge on head; narrow pinard-yellow band from occiput close along back to upper surface of caudal peduncle, margined each side side narrowly with red; another narrow band from snout medially embraces upper half of eye parallel, though only about far as seventh dorsal ray; third band white, little wider, parallel, from front side of snout close below eye across opercle, then superior at caudal basally or along just

over lateral line; opercular flap edged above and more broadly below orange-chrome, and end of flap yale-blue; on trunk white band with narrow red edge above; sides of head livid pink, under surface naphthaline yellow; last tint also along lower side, and area along sides medially to white band, orange-vinaceous; dorsal ventral blackish with 8 greenish-yellow tint terminal on spinous fin and median longitudinal band of same, entire fin edged white; and dusky, with neutral tint forward, and warm tint forward basally, fin edge pale yellowish forward, hind edge whitish; caudal largely whitish, with pale yellowish tinge on rays basally and broad black subterminal band; pectoral and ventral with dull red and olive tints, front of latter deeper in color; iris dull red in front and behind, above and below pale yellowish.

Our material entirely supports Günther's contention that Julis eydouxii is simply the adult.²²²

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 282.

Julis greenovi Bennett, Fig. 256a.
 Drawing of example from Oahu by
 Richard I.

Cheilio inermis (Forsk.) Fig. 257.

Head $2 \frac{7}{8}$ to $3 \frac{1}{8}$; depth $6 \frac{3}{4}$ to $6 \frac{7}{8}$; D. IX, 13, 1;
 A. III, 12, 1; scales 44 to 47 in lateral line to caudal base
 and 1 to 3 more on latter; 5 scales above lateral line to spinous
 dorsal origin, 6 or 7 to soft dorsal origin, and 10 below to
 spinous anal origin; 10 to 12 predorsal scales; snout $2 \frac{1}{4}$ to
 $2 \frac{2}{5}$ in head; eye $4 \frac{1}{8}$ (young) to $8 \frac{1}{4}$; maxillary $2 \frac{2}{5}$ to $3 \frac{1}{4}$;
 interorbital $3 \frac{1}{4}$ to 8; head width $3 \frac{2}{3}$ to $4 \frac{1}{8}$. Snout conic,

width $2 \frac{1}{3}$ to $2 \frac{2}{3}$ its length. Rakers $5+12$, lanceolate, 2 in filaments, which $1 \frac{1}{3}$ in eye. Scales thin, exposures triangular, basal radiating striae 27 to 32, apical 62 to 64; tubes in lateral line with well-developed midrib and terminal cluster of 8 to 11 branches. Color in alcohol dull brownish, each scale with vertical pale bar, margined in front and behind with equally wide brown bar. Fins pale brown. Dorsals with reticulated pale brown lines and anals with short broad pale vermiculate bars on lines. Length 70 to 310 mm. Ten Hawaiian examples, of which 3 labeled Maui and 5 Oahu.

Thalassoma duperrey (Quoy and Gaimard). *Fig. 258 and 259.*

Head 3 to $3 \frac{1}{3}$ in ^{female}, $3 \frac{1}{3}$ to $3 \frac{2}{5}$ in ^{male}; depth $3 \frac{1}{8}$ to $3 \frac{2}{5}$; D. VIII or IX, 12, 1, varies occasionally 13, 1, rarely 11, 1; A. II or III, 11, 1; tubular scales 25 or 26 in lateral line to caudal base, and 1 or 2 more on latter; 3 or 4 scales above lateral line to spinous dorsal origin, 9 or 10 below to spinous anal origin, 9 or 10 predorsal scales in ^{female}, 6 to 9 in male; snout $2 \frac{2}{5}$ to $2 \frac{2}{3}$ in head in female, $2 \frac{7}{8}$ to $3 \frac{3}{5}$ in male; eye $4 \frac{3}{5}$ to $6 \frac{2}{5}$; maxillary $3 \frac{1}{5}$ to $3 \frac{1}{4}$ in female, 4 to $4 \frac{4}{5}$ in male; interorbital $4 \frac{1}{4}$ to 5 in female, $3 \frac{3}{4}$ to 4 in male; head width $2 \frac{1}{10}$ to $2 \frac{2}{5}$. Snout compressed, width 1 to $1 \frac{1}{2}$ its length. Rakers 6 to $8+12$ to 14 short points, $\frac{1}{5}$ to $\frac{1}{4}$ of filaments, which 1 to $1 \frac{1}{6}$ in eye. Head naked, except small patch of scales on upper surface; basal radiating striae on scales 33 to 50, apical 23 to 35, median reticulate area moderate to absent. Color in alcohol of female dull brownish, each

scale with narrow dark vertical streak or line, and as others show through each scale apically narrow vertical barred appearance results. Males likewise dull uniform brownish generally, each scale with 2 narrow pale vertical lines. Adult males with head, dorsals and anals deep or slaty-brown. Pectoral brownish, oblique dusky or slaty-brown blotch forming narrow point forward. Ventral and caudal brownish, hind edge of latter narrowly pale. Length 110 to 197 mm. Twelve examples, all Hawaiian, labeled Maui, Hilo and Oahu.

"Gunther has admitted his Julis obscura as simply the female, thus Julis verticalis Smith and Swain and Thalassoma ballieni Snyder, and Jordan and Evermann being added as synonyms. The last name, however, he thinks is incorrectly applied by these writers. Julis ballieni Vaillant and Sauvage is insufficiently characterized. The specimens in the Academy Fowler listed as Thalassoma ameitensis and T. hebraica²²³, from the Hawaiian Islands, are all synonymous with the present species, and have been examined and compared in this connection.

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Proc. Acad. Nat. Sci. Phila., 1900, p. 510.

Thalassoma g ntheri (Bleeker). *Fig. 260.*

Head $2 \frac{4}{5}$ to $2 \frac{5}{6}$; depth $3 \frac{1}{4}$ to $3 \frac{1}{2}$; D. VIII, 13, 1; A. II, 11, 1; scales 25 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin; 3 to soft dorsal origin, and 9 or 10 to spinous anal origin; 6 or 7 predorsal scales; snout $2 \frac{7}{8}$ to 3 in head; eye $4 \frac{4}{5}$ to $5 \frac{1}{5}$;

maxillary $3 \frac{3}{5}$ to $3 \frac{2}{3}$; interorbital 4 to $4 \frac{1}{3}$.

Body elongate. fusiform, strongly compressed; caudal peduncle length $1 \frac{1}{6}$ to $1 \frac{1}{4}$ its least depth; latter $2 \frac{3}{4}$ to 3 in head. Head width $2 \frac{1}{3}$ to $2 \frac{2}{5}$ its length. Snout conic, width $1 \frac{1}{4}$ its length. Eye elevated, advanced, though hind edge slightly behind center in head length. Mouth moderate, jaws even. Maxillary $\frac{2}{3}$ to eye, not quite to front nostril. Teeth uniserial, pair of canines in front of each jaw, lower pair closer and fitting in between upper; teeth gradually smaller toward rictus; no hind canines. Front nostril at last sixth in snout; hind one well separated, little larger and superior or nearly over front eye edge. Interorbital convex, with slight median depression.

Rakers $9 + 13$, lanceolate, 4 in filaments, which 2 in eye. Head naked, except cluster of 5 scales at upper edge of opercle; body scales moderate, smaller and more lanceolate along and on bases of dorsals and anals; caudal scaly at least over basal third; predorsal and chest scales little smaller than body scales; basal radiating striae 36 to 41, apical striae 28 to 34, with median reticulated area large; circuli fine; lateral line concurrent with back, drops below last 3 dorsal rays midway along caudal peduncle side medially; tubes in lateral line with 4 to 7 branches, all well exposed. First dorsal spine $6 \frac{2}{3}$ to 8 in head; last dorsal spine $3 \frac{2}{5}$ to $4 \frac{3}{4}$; first dorsal ray

2 $\frac{4}{5}$ to 2 $\frac{7}{8}$; second anal spine 4 $\frac{2}{3}$ to 4 $\frac{4}{5}$; first anal ray 2 $\frac{4}{5}$; caudal 1 $\frac{1}{4}$; pectoral 1 $\frac{2}{5}$ to 1 $\frac{4}{7}$; ventral 2 $\frac{1}{2}$ to 2 $\frac{2}{3}$.

Color in alcohol back and head mostly with dark quaker-drab, varying to mouse-gray. Head same, though varies to oliveaceous. Dull olive-gray line from behind eye across and along upper opercle edge to flap. Another from below eye down across lower part of opercle to gill-opening. Under surface of body and streak along lateral line, which carried superiorly along caudal peduncle to middle of upper caudal lobe base grayish-olive. Dark area of back with dark center to each scale. Iris dark olive. Dorsals dusky or dark quaker-drab, edges pale or light brownish. Other fins all dull brown, except pectoral, which dusky terminally, and dusky-leadens spot at pectoral origin. Length 132 to 142 mm. Two examples without locality,

likely from Samoa or Fiji? Richard's drawing from an example secured in the Pomotou.

Garrett's figure, as reproduced by Günther,²²⁴ we have not seen, as the plate 144 is missing from the copy in the Academy.

²²⁴

Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 294, Pl. 144, fig. c.

Thalassoma purpureum (Forskål). *Fig. 26/.*

Head 3 $\frac{1}{4}$; depth 3 $\frac{1}{4}$; D. VIII, 13, 1; A. II, 11; scales 26 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 9 below to spinous anal origin; 11 predorsal scales; snout 2 $\frac{2}{3}$ in head; eye 8; maxillary 3 $\frac{3}{4}$; interorbital 4 $\frac{1}{4}$; head width 2 $\frac{1}{3}$. Snout

conic, compressed, width $1 \frac{3}{5}$ its length. Eye elevated, hind edge little before middle in head length. Mouth moderately inclined, jaws even. Maxillary about $\frac{2}{3}$ in snout, mostly concealed. Pair of canines in front above, one below, other teeth uniserial, little smaller behind. Lips coriaceous, lower little wider, width $1 \frac{1}{3}$ in eye. Front nostril at last fifth in snout, hind one midway between it and eye. Interorbital convex. Head naked. Scales small on front predorsal, also on breast, chest and caudal base; along dorsals and anals basally row of smaller scales than on body; basal radiating striae 69; apical 55, all joining broad median reticulated area; tubes in lateral line with 2 to 4 slender branches. Length 322 mm. (body skinned out). Pomoton.

Two drawings, doubtless intended for the above differ in showing rather large pale blotches between the longitudinal pale bands along side. The markings on the head are nearly perfect in agreement.

A sketch made on board the Porpoise at Lazuriff Island is detailed as light green along the edge of the back and caudal peduncle; broad band of lake from upper hind opercle edge to below last third of soft dorsal; small bluish area below first 5 dorsal spines and forward dark purple triangle down towards hind eye edge where abruptly bent backward as bright red fork, upper prong of which extending obliquely across opercle before and below pectoral base as narrow red band;

lower fork crosses preopercle down along front edge of interopercle from lower pectoral axil this also extended backward to middle of lower caudal lobe as vermilion streak and finally blue on caudal fin; parallel from origin of pectoral similar narrow vermilion band to middle of caudal base; opercle flap light red; interorbital and frontal region down to near snout tip, though leaving broad triangle on preorbital before eye, bright red; under surface of head, breast and rest of body light blue; intervening area between 2 longitudinal vermilion bands on body green forward and light blue along caudal peduncle side; dorsals red over larger area basally and margin broadly blue; anals with narrow red base and broad light blue outer portion; caudal light green; pectoral with upper half blue, lower half green and pre-basal area above red band, yellow; ventral blue.

A color sketch from Honden Island, August 1839 shows upper edge of back purple, turning to narrow submarginal band along upper caudal edge; upper edge of upper lip along snout edge, narrowly orange; orange band from lower eye edge crosses preopercle angle, then forking on opercle and below, though along preopercle edge also as short orange bar; narrow edge of snout, lips and head below blue, also chest; postocular and cheek green; upper branch of orange fork on opercle continues obliquely below pectoral base, also short bar above parallel along pectoral base, area between yellowish-green; median red horizontal band on trunk and another parallel below from pectoral axil, these all more or

less joined or with short intersecting vertical red bars; lower red band extends submarginally along lower caudal lobe like upper; hind caudal edge green, with 8 horizontal streaks purple or blended with blue; dorsals green basally, terminally blue, soft fin with narrow green edge; median dull purplish band longitudinally on both dorsals, subterminal on spinous fin, more median on soft fin; anal with blue base, broad margin green, and longitudinal band orange; pectoral blue; ventral green; iris olive, red circle around pupil.

We find on comparison, the type of Thalassoma pimmanis Fowler is synonymous, as contended by Jordan and Evermann.

A small dry skin also from Thornton Island, is in the Academy.

Three other small dry skins in the Academy, from the Hawaiian

Islands were wrongly included as T. purpureum²²⁵ and are appar-

ently T. fuscum (Lacépède). All still retain a blackish or dusky

blotch on the first and part of the second membranes of the spi-

nous dorsal. Though the colors have otherwise largely faded

they show very slight traces of the pattern characteristic of

T. fuscum. All appear to have the caudal convex behind.

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Proc. Acad. Nat. Sci. Phila., 1900, p. 510.

Thalassoma umbrostigma (Rüppell). *Fig. 262.*

Head 3 to 3 1/2; depth 3 3/5 to 3 7/8; D.VIII, 13, i; A. II, i; scales 25 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 3 to soft dorsal origin, and 8 or 9 below to spinous anal origin;

8 or 9 predorsal scales; snout 3 to $3 \frac{1}{8}$ in head; eye 5 to $5 \frac{2}{5}$; maxillary $3 \frac{1}{2}$ to $3 \frac{4}{5}$; interorbital $4 \frac{1}{8}$ to $4 \frac{1}{2}$; head width $2 \frac{1}{3}$ to $2 \frac{5}{6}$. Snout conic, width $1 \frac{1}{5}$ to $1 \frac{1}{4}$ its length. Rakers 7+12, lanceolate, 4 in filaments, latter $1 \frac{1}{5}$ in eye. Scales with basal radiating striae 26 to 28, apical 24 to 26; scales in lateral line usually with 3 branches, last with 5.

Color in alcohol dull brownish generally, abdomen and sides paler. Over back 7 vertical pale bands, all scales in darker interspaces with dark basal bar, which now showing through overlapping scales produces finely barred pattern of vertical lines. Head marked with short bars, streaks and spots of brown, smaller and more crowded on smaller example, but in all cases forming dark angular line directed downward in preorbital. Fins all pale brown. Small brown spot at base of each dorsal spine and ray, and black blotch over first and second spinous dorsal membranes. Small brown spot at pectoral origin. Anal with sub-basal narrow pale brown line its entire length. Length 98 to 140 mm. (caudal damaged). Maui and Oahu, 2 examples. *Richard's drawing from Maui and one from Oahu in 1858.* Our examples are of interest as the first Hawaiian are ones obtained.

Thalassoma janseni (Bleeker). *Fig. 263.*

Head 3; depth $3 \frac{1}{5}$; D. VIII, 13, 1; A. II, 11, 1; scales 25 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to spinous dorsal origin, 2 to soft dorsal

origin and 8 below to spinous anal origin; 7 predorsal scales; snout $2 \frac{3}{4}$ in head from upper jaw tip; eye $5 \frac{3}{4}$; maxillary $4 \frac{1}{8}$; interorbital 4.

Body elongately fusiform, strongly compressed; caudal peduncle length $\frac{3}{4}$ its least depth, which $2 \frac{2}{5}$ in total head length. Head width $2 \frac{1}{5}$ its length. Snout compressed, width at eyes $1 \frac{1}{3}$ its length. No posterior canines. Interorbital convex. Rakers $8+12?$ short rudimentary points, 3 in filaments, which $1 \frac{1}{6}$ in eye. Head naked, except cluster of 5 scales just above opercle; predorsal and breast scales little smaller than others; smaller body scales crowded along bases of dorsals and anals and caudal scaly basally about $\frac{2}{5}$ its extent, smaller scales crowded above and below marginally much further back; basal radiating striae 49 to 52, apical 32 or 33, all connected by broad median reticulated area; circuli very fine, fewer and obsolete apically; tubes in lateral line largely arborescent, with 3 to 8 branchlets.

General color in alcohol whitish, especially clear above pectoral and behind gill-opening. Broad deep brown blotch on head behind eye low as eye and then slopes back to embrace upper half of opercular flap. On trunk same color extends back from predorsal to behind pectoral base, not below it. Vertical wedge of dusky-brown on back just after middle of depressed pectoral, extending above to edge of spinous dorsal from after fourth to seventh spines, below narrowed at point just before anal.

From end of first soft dorsal ray down to front of soft anal marginally broadest brown band, behind leaving caudal peduncle whitish and in its extent embraces all of soft dorsal and anal posteriorly. All scales on trunk within dark areas each with slightly darker median vertical streak. Base and edges of caudal above and below little more brownish than rest of fin. Pectoral largely brownish. Ventral tinted dull yellowish-brown, lower outer edges slightly darker. Iris brownish. Length 203 mm. Fiji.

Our example agrees largely with Bleeker's figure²²⁶, except pectoral without dark base, dark color on head extended lower and includes upper part of opercular flap, caudal paler and dark area on anal more extended forward.

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Julis janseni Bleeker, Atlas Ich., vol. I, 1862, p. 91, Pl. 34, fig. 5.

Gomphosus tricolor Quoy and Gaimard. *Fig. 264.*

Head $2 \frac{1}{4}$ to $2 \frac{1}{2}$; depth $3 \frac{7}{8}$ to $4 \frac{1}{4}$; D. VIII, 13, 1; A. II, 11, 1; scales 26 or 27 in lateral line to caudal base and 2 more on latter; 5 scales above lateral line to spinous dorsal origin, 4 to soft dorsal origin, 9 below to spinous anal origin; 10 or 11 predorsal scales; snout $1 \frac{2}{3}$ to $1 \frac{3}{4}$ in head; eye $9 \frac{1}{3}$ to $10 \frac{1}{4}$; maxillary $3 \frac{2}{5}$ to $3 \frac{1}{2}$; interorbital $6 \frac{1}{5}$ to $6 \frac{1}{4}$.

Body strongly compressed; caudal peduncle length $1 \frac{2}{5}$ to $1 \frac{2}{3}$ its least depth, latter $3 \frac{2}{3}$ to $3 \frac{3}{4}$ in total head length. Head width $3 \frac{1}{4}$ to $3 \frac{2}{5}$ its length. Snout produced, width at eyes $3 \frac{3}{5}$ to $3 \frac{2}{3}$ its length. Interorbital convex. Rakers 8-16, small, lanceolate, 3 in filaments, which about equal eye. Scales rather uniformly large, smaller in front predorsal, breast and caudal basally, also lanceolate and small ones crowded moderately along bases of dorsals and anals; basal radiating striae 35 to 50, apical 28 to 36 and most continuous with basal striae by median crowded reticulations; tubes in lateral line slender, simple or with 1 to 5 well-developed branches. First dorsal spine $9 \frac{2}{3}$ to $11 \frac{1}{4}$ in head; last spine $7 \frac{2}{5}$ to $8 \frac{1}{2}$; first dorsal ray $4 \frac{4}{5}$ to $5 \frac{1}{4}$; third anal spine $6 \frac{4}{5}$ to 7; first anal ray $4 \frac{2}{5}$ to 5; caudal $1 \frac{9}{10}$ to $2 \frac{1}{8}$, emarginate behind, ends above and below pointed; pectoral $2 \frac{1}{8}$ to $2 \frac{1}{6}$; ventral 3 to $3 \frac{1}{8}$.

Color in alcohol largely uniform brownish, fins little paler. Pectoral with hind edge pale, then broad dark submarginal area obliquely. Length 233 to 239 mm. Two from Tahiti.

Gomphosus variegatus Lacépède. Fig. 264a.
 drawing of young example from Fiji,
 by J. H. Richard in 1858.

Cirrhilabrus solorensis Bleeker *Figs. 264b.*

Head $2 \frac{7}{8}$; depth $3 \frac{1}{3}$; D. XI, 8, i; A. III, 8, i; scales 16 in upper section of lateral line, 6 in horizontal section to caudal base, and 1 more on latter; 2 scales above lateral line to spinous dorsal origin, to soft dorsal origin, 5 below to spinous anal origin; 5 predorsal scales; snout $4 \frac{2}{5}$ in head from upper jaw tip; eye $3 \frac{2}{5}$; maxillary $3 \frac{7}{8}$; interorbital $3 \frac{2}{8}$; head width $2 \frac{1}{4}$. Snout conic, length $\frac{7}{8}$ its width. Above 6 canines flaring out in front, posterior largest and directed backward; pair of lower forward well-spaced, though smaller, canines. Interorbital broad, slightly convex. Hind preopercle edge finely serrate. Rakers 2 8, lanceolate about $\frac{1}{3}$ of filaments, which 2 in eye. Cheek scales in 2 rows; scales with 10 basal radiating striae and about 29 more marginally, chiefly apical, more or less connected with basal, about 5 incomplete, lateral line tubes simple, well exposed. In alcohol color largely dull uniform brown. Length 55mm. (caudal broken). *Maui*.

We identify our specimen with Bleeker's East Indian species as it shows 2 rows of cheek scales, uniform anal and the dentition in agreement. The figure of C. jordani Snyder, shows a different shaped ventral and but 1 row of cheek scales.

Pseudochelinus hexataenia (Bleeker).

Fig. 264-C.

Drawing of example from brain
by Richard!

unifasciatus Streets.
Cheilinus diagrammus (Lacépède) *Fig. 265.*

Head $2 \frac{2}{5}$ to $2 \frac{3}{5}$; depth $2 \frac{2}{3}$ to $2 \frac{9}{10}$; D. IX, 11, 1, once 10, 1; A. III, 8, 1, once 9, 1; scales 14 or 15 in upper section of lateral line, 6 or 7 in lower section to caudal base and 3 on latter; 2 scales above lateral line to dorsal origin, 2 to soft dorsal origin, 6 below to spinous anal origin; 4 predorsal scales; snout $2 \frac{2}{7}$ to $2 \frac{1}{2}$ in head from upper jaw tip; eye 6 to $6 \frac{2}{3}$; maxillary $2 \frac{1}{2}$ to $2 \frac{4}{5}$; interorbital $4 \frac{2}{5}$ to 5.

Body compressed; caudal peduncle length $\frac{3}{5}$ to $\frac{3}{4}$ its least depth, which $2 \frac{1}{4}$ to $2 \frac{4}{5}$ in total head length. Head width $2 \frac{1}{8}$ to 3 in its length. Snout conic, width $1 \frac{1}{4}$ to $1 \frac{1}{2}$ its length. Interorbital convex. Preopercle edge membranous, rather firm. Rakers 5+9, short lanceolate points, $1 \frac{1}{4}$ to $1 \frac{2}{5}$ in filaments, which $1 \frac{4}{5}$ to 2 in eye. Predorsal with scales entirely, little smaller than others; basal radiating striae 16 to 21, apical 33 to 43 and continuous with central reticulations; circuli very fine. First dorsal spine 5 to $\frac{3}{4}$ in head; last spine $3 \frac{1}{5}$ to $4 \frac{3}{4}$; first dorsal ray $2 \frac{9}{10}$ to 3; third anal spine $3 \frac{1}{4}$ to 5; first anal ray $2 \frac{7}{8}$ to $3 \frac{1}{4}$; caudal $1 \frac{1}{2}$ to $1 \frac{3}{5}$, hind edge convex, each corner forming short though distinct point, less pronounced in smaller examples; pectoral $2 \frac{1}{10}$ to $2 \frac{1}{3}$; ventral $2 \frac{1}{4}$ to $2 \frac{7}{8}$.

Color in alcohol largely dull brownish, more or less uniform, with traces of paler spots or short vertical streaks, one on each scale. Obscure, though slightly darker, submarginal streak on spinous dorsal. Fins slightly paler than

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general body-color, though soft
dorsal mostly more brownish forward
and along base. Length 203 to 290 mm.
Two from Hilo.

Cheilinus unifasciatus 'Streets' in

'Bull. U. S. Nat. Mus., No. 7, 1877, p. 82.

Fanning Islands.

the oldest available name. The species
has usually been known as Cheilinus
hexamatus Günther? Günther shows a

² Journ. Mus. Godeffroy, 15 Sept 7, 1881, p. 247,
Pl. 135, fig. a.

series of scales extending the whole extent
of the dorsal and anal fin, 3 rows
of cheek scales, a broad pectoral base
and hind caudal edge quite convex.
The alleged character of the hexagonal
scales on the back, however, would
hardly appear very striking, as our ex-
amples of C. diogenes show at least
some of the same pattern. Jordan and
Evermann reproduce Jenkinson's figure of
C. yonnes as C. hexamatus, but aside
from the hind caudal quite convex, it
appears much like Günther's figure

of C. radiatus and our examples of 648
C. digrammus. Traces of the pale area
on the part of the caudal peduncle
seen evident in our examples.

Journ. Mus. Godeffroy, vol. 15, left 7,
1881, Pl. 135, fig. 67.

Cheilinus diagrammus (Lacépède), Fig. 266. (649)

Besides one from Fiji in the Wilkes Collection 200 mm. long, we have examined examples in the

Academy from Samoa and Sumatra. These agree in every way with C. diagrammus. A Sumatran specimen 225 mm. long, when fresh arrack, faded warm brown above, slightly tinged dull olivaceous, also scale edges somewhat olivaceous. Lower surface of body paler, washed with pale blue, also scale edges brighter. Head brown, marked with whitish lines and bars, mostly parallel with upper profile on upper surface. Narrow blackish-brown oblique line down from cheek across gill-opening. Spinous dorsal dusky, edge pale and other vertical fins clear blue. Caudal dull orange, also axil of former.

Cheilinus fasciatus (Bloch). Fig. 267.

Head $2 \frac{3}{5}$ to $2 \frac{3}{4}$; depth $\frac{2}{5}$ to $2 \frac{3}{5}$; D. IX, 10, 1; A. III, 8, 1; 14 or 15 scales in upper section of lateral line, 7 to 9 in lower section to caudal base and 1 or 2 more on latter; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 6 below to spinous anal origin; 5 to 7 predorsal scales; snout $2 \frac{1}{4}$ to $2 \frac{3}{4}$ in head from upper jaw tip; eye $4 \frac{4}{5}$ to $6 \frac{2}{3}$; maxillary $2 \frac{4}{5}$ to $3 \frac{2}{5}$; interorbital 3 to $3 \frac{1}{2}$.

of the dorsal and anal fins, 3 rows of cheek scales, a broad pectoral base and hind caudal edge quite convex. The alleged character of the hexagonal scales on the back, however, would hardly appear very striking, as all our examples of C. diagrammus show at least some of the same pattern. Jordan and Evermann reproduce Jenkin's figure of C. zonurus as C. hexagonatus, but aside from the hind caudal edge quite convex, it appears in every way closer to Gunther's figure of C. radiatus

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Journ. Mus. Godeffroy, vol. 15, heft 7, 1881, Pl. 135, fig. b.

Body moderately oblong, deep, compressed, upper profile little more curved; caudal peduncle length $\frac{3}{5}$ to $\frac{2}{3}$ its least depth, which $2\frac{1}{5}$ to $2\frac{3}{8}$ in total head length. Head width $1\frac{1}{6}$ to $2\frac{1}{10}$ its length. Snout conic, compressed, width 1 to $1\frac{1}{5}$ its length. Eye elevated about midway in head length, hind edge midway in young. Mouth rather large, jaws powerful, even or lower slightly produced. Free preorbital down at groove till opposite front eye edge. Maxillary concealed. Lips wide, thick, fleshy. Teeth conic, mostly uniserial, several inside forward; pair of large curved canines in front of each jaw, lower pair closer. Nostrils small, well separated; front one at last fourth in snout; hind one midway between front one and eye. Interorbital convex. Preopercle edge membranous, free. Rakers iv 2 to ~~4~~ 6 short rudimentary points, $2\frac{1}{2}$ in filaments, which $1\frac{3}{4}$ in eye. Head scaly, except muzzle, preorbital and suborbitals; 2 rows of broad scales largely cover cheek, only broad preopercle flange naked below; scales uniformly large and narrowly imbricated, elongated and extending well out along bases of vertical fins and large scale on caudal basally half fin's extent; scales with basal radiating striae 8 to 10, apical 22 to 24, fuse central reticulations; circuli very fine; upper section of lateral line concurrent with edge of dorsal squamous area, extends until below fifth dorsal ray base; lower

section begins several scales forward, midway along caudal peduncle side, horizontal; tubes in lateral line slender, mostly simple or only occasional short rudimentary branch. First dorsal spine $4 \frac{2}{5}$ to $6 \frac{2}{3}$ in head; last spine $2 \frac{1}{5}$ to $3 \frac{1}{4}$; seventh dorsal ray $1 \frac{2}{3}$ to $1 \frac{9}{10}$; third anal spine $2 \frac{1}{5}$ to $3 \frac{1}{8}$; sixth anal ray $1 \frac{1}{4}$ to $1 \frac{1}{3}$; pectoral $1 \frac{1}{2}$ to $1 \frac{9}{10}$; ventral $1 \frac{2}{3}$ to $2 \frac{1}{6}$; caudal $1 \frac{1}{5}$ to $1 \frac{2}{5}$ to median hind edge, convex behind, upper and lower edges produced as sharp slender points, half rest of fin in adult, absent in young. Length 117 to 286 mm. One from "Maui" though according to the drawing from Manilla we also include 5 Samoan, and a Sumatran example, in the Academy.

When fresh in a rack our Sumatran example mostly orange-yellow, lower surface warmer about abdomen. Head with dull olivaceous-purple tint, darker above. Pale or whitish streaks, short, some broken, radiate from eye. Similar colored dots and spots all over hind side of head, down over chest and abdomen. Series of black blotches, each at base of scale, extend from above and behind eye along front portion of back above lateral line. Number of scales on front of trunk with black basal blotches narrowly exposed. Two broad black blotches above opercles, upper edge of opercular flap narrow, blackish, also bar before pectoral base. Many small deep brown spots about pectoral region. Side of trunk with 6 broad deep purple transverse bands, which also extend out to middle of vertical

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fins; in these scales each band marked with blackish center and traces of minute pale spots visible. Vertical fins mostly light yellow; dorsals with dusky edge marked with 2 whitish submarginal longitudinal lines, lower broken into bars and spots on soft dorsal; small pale spots on dark transverse bands on both dorsals and anals; anal edge like dorsal, though pale lines more broken; caudal with 2 broad slaty-black transverse bands, first just after yellow basal scales, others form broad dark fin edge; both marked above and below with pale spots. Pectoral uniform pale brown. Ventral similar, pale brownish medially.

Fowler recorded the above as C. enneacanthus,²²⁹ as Bloch's fish was ascribed to Japan, probably by error. Bloch and Günther's figures agree in the absence of a black spot at pectoral base above.

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Journ. Acad. Nat. Sci. Phila., (2) vol. 12, 1904, p.

Cheilinus bimaculatus Valenciennes. *Fig. 268.*

Head $2 \frac{1}{2}$ to $2 \frac{3}{4}$; depth $2 \frac{3}{4}$ to $3 \frac{1}{5}$; D. IX, 10, 1; A. III, 8, 1; scales 15 or 16 in upper section of lateral line, 6 in horizontal section to caudal base and 2 more on latter; 2 scales above lateral line to soft dorsal origin, 5 or 6 below to spinous anal origin; 6 to 8 predorsal scales; snout 3 to $3 \frac{1}{4}$

in head from upper jaw tip; eye 4 to $4 \frac{3}{5}$; maxillary $2 \frac{4}{5}$ to 3; interorbital $4 \frac{1}{2}$ to $5 \frac{1}{8}$.

Head width $2 \frac{1}{3}$ to $2 \frac{1}{2}$ in total head length. Snout conic, length 1 to $1 \frac{1}{5}$ its width. Rakers 4+6, short points, 4 in filaments, which 2 in eye. Scales with 10 basal radiating striae, 27 apical. Color in alcohol dull brownish generally, each row of scales with slightly darker longitudinal obscure band. Trunk with obscure paler mottling or spots. Black ocellus behind eye about size of pupil. Pale or obscure short gray lines radiate from eye. Along row of scales immediately below lateral line at fourth to sixth, round black ocellus size of pupil. Fins all pale brown, spinous dorsal with fine oblique streaks of darker brown, which also extend on front of soft dorsal. Similar markings over median part of caudal basally, spinous anal and most of soft fin marginally. Ventral with outer portion slightly brownish and obscurely mottled, inner rays whitish. Length 90 to 98 mm. Four from Maui.

Cheilinus chlorurus (Bloch). *Figs. 269-271.*

Head $2 \frac{1}{3}$ to $2 \frac{3}{4}$; depth $2 \frac{1}{2}$ to $2 \frac{3}{5}$; D.X, 9, 1, or 10, 1; A. III, 8, 1; scales 15 or 16 in upper section of lateral line, 5 to 7 scales in horizontal section to caudal base and 2 or 3 more on latter; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 6 below to spinous anal origin; 5 or 6 predorsal scales; snout $2 \frac{7}{8}$ to $3 \frac{1}{4}$ in head from upper jaw tip; eye $3 \frac{3}{4}$ to $6 \frac{1}{8}$; maxillary 3 to 4; interorbital $3 \frac{4}{5}$ to 5.

Body well compressed; caudal peduncle length $1 \frac{2}{5}$ to $1 \frac{1}{2}$ its least depth, which $2 \frac{1}{4}$ to $2 \frac{2}{5}$ in total head length. Head width 2 to $2 \frac{1}{4}$ its length. Snout conic, length $\frac{7}{8}$ to 1 its width. Hind eye edge little before head center. Old examples with short inner row of teeth each side and inside above, of conic form. Interorbital convex. Preopercle edge membranous, rather firm. Rakers 6 6, lanceolate, short, $1 \frac{1}{4}$ in filaments, which $1 \frac{2}{3}$ in eye. Two rows of broad scales largely cover cheek; scales along bases of vertical fins extended well out over fins basally; basal radiating striae 25 to 32, apical 20 to 45, and continuous with central reticulations; circuli very fine; tubes in lateral line slender, mostly with 1 to 3 short branches above or below. First dorsal spine $5 \frac{1}{5}$ to $5 \frac{1}{4}$ in total length; last spine $2 \frac{7}{8}$ to 3; sixth dorsal ray $1 \frac{4}{5}$ to $2 \frac{1}{2}$; third anal spine $2 \frac{2}{5}$ to $2 \frac{7}{8}$; fifth anal ray $1 \frac{1}{2}$ to $2 \frac{2}{3}$; caudal $1 \frac{1}{5}$ to $1 \frac{1}{2}$, convex, behind in young, in adult ends above and below extended as sharp points, sometimes pronounced, or only one point may be developed; pectoral $1 \frac{3}{5}$ to 2; ventral $1 \frac{1}{4}$ to 2.

Color in alcohol largely dull umber-brown, not paler below. Head thickly dotted with pale, also few short irregular variable bars from eye. Row of similar small spots or dots along each row of body scales, though variable and rows often incomplete. Still smaller and more crowded pale dots extend out on dorsals and anals, though most numerous basally. Spi-

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nous dorsal with submarginal deep brownish shade, ending in dark blotch on front of soft dorsal. Caudal brownish basally, mottled finely with paler. Pectoral pale brown, also ventral, which finely and thickly dotted with pale or whitish. In young 4 broad obscure transverse dusky bands, first above eye, second at predorsal and front of spinous dorsal, third at middle of spinous dorsal, fourth at end of spinous dorsal and front of soft dorsal and fifth on caudal peduncle. Behind fourth dark band soft dorsal and anal pale, also caudal, mottled with dusky. Scattered dusky and pale spots on trunk and head. Conspicuous black spot at caudal base on lateral line. Several dark streaks from front of eye forward. Length 47 to 230 mm. Seven from Fiji, Hilo, Samoa and Pomoton. We also include 2 young Samoan examples in the Academy.

Kendall and Radcliffe²³⁰ note "Gunther's figure of C. chlorurus is not the C. chlorurus figured by either Bloch or Bleeker, and differs in coloration and in having a rounded caudal". We cannot accept this statement as Bleeker figures an example certainly the species before us. He had 31 East Indian specimens and found the caudal simply convex behind in the young, and similar in the adults, but the points above and below produced $4 \frac{1}{4}$ to $5 \frac{1}{5}$ in the body length. Bleeker says the figure of Bloch's Sparus chlorurus is very faulty,

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Mem. Mus. Comp. Zool., 1911, p. 304.

and he questions if it actually portrays the species. Crude as it is, however, it shows the pale spots or dots on the predorsal, muzzle and about the eyes, but no pale lines. The cheeks show 5 rows of scales, this entirely at variance with our material. Günther's figure, surely, is quite different from Bloch's or Bleeker's, in such features as its short ventrals, more regular pattern of spots, though in general design we feel it is intended for the present species. The closely related and variable C. trilobatus is also very similar, but may always be distinguished by the more complete pale or reddish lines about the eyes, one or more at least extending down on the cheek vertically. In C. chlorurus these are only a very few short imperfect lines, moreover the spots are general over the body, while in C. trilobatus they are confined to the head and caudal and the body scales largely with vertical bars.

Novaculichthys taenionurus (Lacépède). *Fay. 272.*

Head 3; depth 3; D. IX, 12, 1; A. III, 12, 1; scales 19 in upper section of lateral line, 4 in horizontal section to caudal base and 1 more on latter; 4 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 9 below to spinous anal origin; snout $3 \frac{1}{3}$ in head; eye $5 \frac{2}{3}$; maxillary 3; interorbital 6; head width $2 \frac{2}{5}$. Snout conic, width $1 \frac{1}{6}$ its length. Maxillary to eye. Rakers 8 12, lanceolate, about $\frac{3}{5}$ of filaments, which $1 \frac{1}{6}$ in eye. Scales with 45 to 55

nasal radiating striae, apical 84 or 85. Color in alcohol brown generally, head paler and deep brown line from eye towards front of spinous dorsal from upper eye edge. Another parallel from hind eye edge curving to upper edge of gill-opening. Third begins at same point behind eye and curves down toward pectoral origin, also from lower eye edge to preopercle corner. All these lines with narrow pale edges. Dark blotch on opercular flap. Iris brassy. Each scale on body with pale or grayish blotch basally, little less than pupil, though spots apparently not present on breast. Black streak above and below narrower, close behind pectoral base. Front of spinous dorsal with 2 large black ocelli, dorsals and anals otherwise brown with paler vertical waved lines, anals more brownish. Caudal pale basally, outer half deep brown with faint paler vertical waved lines. Pectoral pale brown. Ventral dark or deep brown. Length 160 mm. Hilo.

Iniistius pavoninus (Valenciennes). *Fig. 273.*

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth $2 \frac{3}{5}$ to $2 \frac{1}{2}$; D. II - VII, 12, 1; A. III, 12, 1; scales 21 in upper section of lateral line, 3 in lower section to caudal base and 1 or 2 on latter; 3 scales above lateral line to third dorsal spine base, 2 to soft dorsal origin, 9 or 10 below to spinous anal origin; snout 2 to $2 \frac{1}{6}$ in head from upper jaw tip; eye $5 \frac{1}{3}$ to 6; maxillary 3 to $3 \frac{1}{2}$; interorbital 5 to $5 \frac{4}{5}$.

Novaculichthys ballizoma (Bleeker). *Fig. 272a.*
Two drawings of examples from Lake Tanganyika.
Richard, one much younger fish.

Body deeply ovate, deepest at pectoral and ventral bases, strongly compressed; caudal peduncle length $1 \frac{2}{3}$ to 2 in its least depth, latter $2 \frac{1}{3}$ to $2 \frac{3}{5}$ in total head length. Head width $2 \frac{3}{5}$ to $2 \frac{2}{3}$ its length. Snout compressed, edge trenchant, width at eyes 2 to $2 \frac{1}{5}$ its length. Hind eye edge midway in head length, pupil center midway in smaller examples. Maxillary to eye, to hind nostril in smaller examples; expansion $1 \frac{3}{4}$ to $2 \frac{1}{6}$ in eye, largely slipping below preorbital. Lips with narrow area of papillae along inner edge. Often one or more canines absent, variable. Interorbital elevated convexly, slightly trenchant medianly. Rakers 8-12 short thick points, 2 in filaments which $1 \frac{1}{4}$ in eye. Head largely naked, only 1 to 3 postero-infraorbital scales and 1 or 2 scales at upper opercle edge; scales with 70 to 116 basal radiating striae, apical imperfect, non-marginal, about 80 to 90 and not continuous with few circuli; tubes in lateral line slender, simple, well over scale exposures. First dorsal spine slender, flexible terminally, $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in head; last spine $3 \frac{1}{2}$ to $3 \frac{4}{5}$; first dorsal ray $2 \frac{1}{8}$ to $2 \frac{1}{2}$; third anal spine $3 \frac{2}{3}$ to $3 \frac{7}{8}$; first anal ray $2 \frac{2}{5}$ to $2 \frac{3}{4}$; caudal $1 \frac{3}{5}$ to $1 \frac{4}{5}$; pectoral $1 \frac{3}{5}$ to $1 \frac{2}{3}$; ventral $1 \frac{3}{5}$ to $1 \frac{4}{5}$.

Color in alcohol pale brownish generally, edge of each scale on back and upper sides slightly darker. Lower body surface paler to whitish. Along sides 4 rather wide pale brownish vertical bands. Scales along lateral line, just above

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eighth to tenth, black. Detached forward spinous dorsal brownish. Narrow submarginal pale brownish line on soft dorsal, and oblique pale brown streaks on fin. Caudal brownish terminally. Anal pale, with narrow submarginal brownish band. Pectoral pale, lengthwise brownish streak along upper part of fin. Ventral whitish. Length 178 to 245 mm. Two from Maui. We also include 3 Hawaiian examples in the Academy.

A comparison with 3 Hawaiian examples of I niger (Steindachner), in the Academy, shows that species differs in no important structural character. Examples 178 mm. long have 71 basal radiating striae on the scales. Its dark color is therefore the only remaining distinction. The Wilkes material being much older than that recently obtained in the Hawaiian Islands by the Academy, is much darker, though of course much paler than in our examples of I. niger.

^U
Cymolutes lecluse (Quoy and Gaimard). *Fig. 274*

Head 3; depth $3 \frac{3}{5}$; D. IX, 14; A. III, 13; scales 56 in upper arch of lateral line, 16 in horizontal section to caudal base, and no tubular ones on latter; 8 scales above lateral line to spinous dorsal origin, 5 to soft dorsal origin, 22 below to spinous anal origin; snout 2 in head; eye $5 \frac{1}{8}$; maxillary 3; interorbital 7.

Body strongly compressed. Head width $2/5$ its length. Snout compressed, width at front of eyes half its length. No posterior canines. Interorbital slightly convex. Preopercle entire, membranous. Rakers 8 10, lanceolate, 3 in filaments, which $1 \frac{3}{5}$ in eye. Head largely naked, except short row of 6 or 7 small scales along hind suborbital edge; head scales encroach each side of front of back well toward eye; breast and chest scales small; scales with about 26 marginal basal striae, apical 23, imperfect; circuli large, marginal, coarse, basal; tubes in lateral line simple, slender, well exposed. Color in alcohol faded largely dull brown, sides and below paler. Fins pale brown. Iris straw-brown. Brown spot, about size of pupil, near upper edge of base. ^{caudal} Length 135 mm. Hawaiian Islands.

SCARICHTHYIDAE.

LeptocottusGalotomus sandwicensis (Valenciennes). 727. 275-

Head 3 to $3 \frac{1}{4}$; depth $2 \frac{3}{5}$ to $2 \frac{3}{4}$; D. IX, 10, 1; A. III, 9, 1; scales 17 to 20 in upper section of lateral line, 5 to caudal base in lower section, and 2 more on caudal base; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin and 6 below to spinous anal origin; predorsal scales 4 to 6; snout $2 \frac{3}{5}$ to $2 \frac{4}{5}$ in head; eye 5 to $5 \frac{1}{2}$; mouth $3 \frac{1}{2}$ to $3 \frac{7}{8}$; interorbital $4 \frac{1}{5}$ to $4 \frac{2}{5}$; head width $2 \frac{1}{8}$ to $2 \frac{1}{5}$. Snout conic, width $1 \frac{1}{5}$ its length. Above 2 small canines. Rakers 5+10, short lanceolate points, about $\frac{1}{4}$ of filaments, which long as eye. Scales with 33 to 33 basal radiating striae, apical 68 to 80. Color in alcohol dull brownish, finely specked or mottled with darker. Trunk with whitish or pale scattered spots, each little smaller than eye, though marked also with dark mottlings. Fins all brownish, with dark transverse waved bands or bars. Dusky-brown blotch on membrane between first 2 dorsal spines. Length 215 to 240 mm. Oahu and Maui. Besides these 2 examples we have compared an Hawaiian example in the Academy.

Scaridea zonarcha Jenkins. 727. 276-

Head 3; depth $2 \frac{3}{5}$ to $2 \frac{2}{3}$; D. IX, 10, 1; A. II, 10, 1; scales 19 or 20 in upper section of lateral line, 5 or 6 in lower section to caudal base and one more on latter; 1 scale above lateral line to spinous dorsal origin, 5 below

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to spinous anal origin; 5 predorsal scales; snout $3 \frac{1}{8}$ to $3 \frac{1}{5}$ in head; eye $3 \frac{2}{3}$ to $4 \frac{1}{6}$; maxillary $3 \frac{1}{3}$ to $3 \frac{2}{3}$; interorbital 4 to 5; head width $2 \frac{1}{8}$ to $2 \frac{3}{5}$. Snout conic, long as wide. No hind canines. Interorbital level to very slightly concave. Rakers about 28, weak, lanceolate, 3 in filaments, which $1 \frac{1}{4}$ in eye. Cheek scales in 2 rows; scales with fine basal marginal striae 17 to 22, about 29 to 32 imperfectly apical; circuli very fine; lateral line with 2 to 4-branched tubes, well exposed, fewer or simple in younger. Color in alcohol brown, mottled with paler and whitish, same as all fins except nearly uniform pale pectoral. Length 65 to 98 mm. Two from Oahu.

Our examples differ from Jenkins' original figure in showing a broad naked area on the cheek below the scales and the preopercle ridge.

Callyodon bicolor (Rüppell).

Head 125 mm., long, of large example from Pomotou. In Polynesia previously noted at Kubary in Ponapé, by Gunther as Pseudoscarus bicolor²³¹. The cheek scales of our example in only 3 rows between the eye and preopercle angle.

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 305.

Callyodon dimidiatus (Bleeker).

Head 3; depth $2 \frac{2}{3}$; D. IX, 10, i; A. II, 9, i; scales 18 in upper section of lateral line. 4 in lower section to caudal base and 2 more on latter; 2 scales above lateral line

to spinous dorsal origin, 2 to soft dorsal origin, and 6 below to spinous anal origin; 7 predorsal scales; snout 3 in head; eye $5 \frac{7}{8}$; mouth $5 \frac{1}{5}$; interorbital $3 \frac{1}{10}$; head width $2 \frac{1}{3}$. Snout convex, long as wide. No hind canines. Rakers about 16. 36 fine slender setae, 3 in filaments, which 5 in head. Scales with basal radiating striae 22, apical 33; upper arch of lateral line ends in row of scales directly bordering horizontal section at front of caudal peduncle. Caudal moderately concave behind. Color in alcohol dull uniform brownish. Front edges of ventral, upper and lower caudal edges darker brown than general color. Length 200 mm. Tongataboo.

Bleeker's figure shows an intervening row of scales between last one in upper section of lateral line and lower section C. fumifrons Jordan and Seale²³² shows the scales irregular, though in the above respect in agreement with our example.

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Bull. Bur. Fisher., 25, 1905(1906), p. 326, Pl. 34.
vol.

Callogadon candofasciatus (Linnaeus). Fig. 277.
Drawing of an example from Tahiti
by J. H. Richard in 1858.

Callogadon dubius (Bennett). Fig. 276a.
Drawing of an example from Tongataboo
by Richard.

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Callyodon oviceps (Valenciennes). *Fig. 278.*

Head $2 \frac{4}{5}$ to $2 \frac{7}{8}$; depth $2 \frac{3}{4}$ to $3 \frac{1}{6}$; D. IX, 10, 1; A. III, 9, 1; scales 20 in upper section of lateral line, 3 or 4 in lower section to caudal base and 2 more on latter; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 6 below to spinous anal origin; 6 predorsal scales; snout $2 \frac{3}{5}$ to $3 \frac{1}{8}$ in head; eye $4 \frac{1}{8}$ to $5 \frac{3}{4}$; mouth $4 \frac{4}{5}$; interorbital $2 \frac{7}{8}$ to 3; head width $2 \frac{1}{4}$. Snout convex, about long as wide. Rakers about 15+23?, setiform, about 3 in filaments, which $1 \frac{1}{5}$ in eye. Scales with 17 to 24. Color in alcohol largely dull brownish, little paler below. Head darker brown above down till level with lower eye lid and middle of opercle flap. Obscure broad pale band on back transversely, crossing sixth to eighth scales of lateral line, another crosses thirteenth and fourteenth scales and traces of third at base of caudal peduncle. Length 88 to 142 mm. Samoa. We have also compared a Samoan example in the Academy 197 mm. long.

Günther's figure²³³ shows 2 anal spines, while in all of ours there are distinctly 3.

The 2 examples Fowler records as Scarus oviceps²³⁴ are referable to two distinct species. One 207 mm. long, undoubtedly is C. perspicillatus (Steindachner). Also it is very likely

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 312, Pl. 152, fig. A.

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Proc. Acad. Nat. Sci. Phila., 1900, p. 512.

As Gunther contends,²³⁵ that Scarus Jenkins and C. miniatus Jenkins are synonymous.

The other specimen is C. dubius (Bennett). It has clearly 3 rows of cheek scales and is 213 mm. long.

A comparison with the type of Scarus lupus Fowler,²³⁶ shows the latter apparently allied in the absence of posterior canines, large eye, disposition of the lateral line, scales, etc. It differs in the presence of only 2 rows of cheek scales, preopercle flange naked, and the presence of the narrow pale bar across the snout.

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Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 322.

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L.c., 1899, p. 490, Pl. 18, fig. 1. Thornton Island.

Callyodon forsteri (Valenciennes). *Fig. 279.*

Head $2 \frac{3}{4}$ to 3; depth 3 to $3 \frac{1}{4}$; D. IX, 10, 1; A. III, 9, scales 18 in upper section of lateral line, 4 in horizontal section to caudal base, and 2 more on latter; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin and 6 below to spinous anal origin; 5 predorsal scales; snout $3 \frac{2}{5}$ in head; eye $4 \frac{1}{4}$; mouth $2 \frac{1}{8}$ to $2 \frac{1}{6}$. Snout conic, long as wide. Larger example with 2 or 3 hind canines above and 2 below; smaller example without canines. Rakers 15 21, fine, setiform, short, $4 \frac{1}{2}$ in filaments, which $4 \frac{2}{3}$ in head. Scales with 27 to 30 radiating basal striae, and 60 to 80 apical, of which many imperfect; 2 rows of cheek scales; each

tube of lateral line with 1 or 2 short branchlets. Large example with deeply lunate caudal; smaller with hind edge slightly lunate, corners pointed. Color in alcohol dull brownish generally. Small example with many obscure small pale spots scattered about back and hind sides. Both show narrow pale line from mouth corner to eye. Fins pale brown, dorsals and anals each with dark marginal band. In larger example upper and lower caudal edges broadly darker than rest of fin. Ventral pale, outer edges rather broadly darker. Length 147 mm. One from Fiji, and another from Samoa.

A Samoan example in the Academy is wrongly recorded by Fowler as Scarus viridis²³⁷. It agrees in most all respects, and has 2 upper and a single lower canine behind on each side. We have also examined another Samoan specimen in the Academy, which varies in the presence of but 2 hind canines, one on each side above.

Gunther²³⁸ identifies Pseudoscarus capistratoides Bleeker with Scarus forsteri Valenciennes.

In this connection we examined 2 large Samoan examples of C. globiceps in the Academy and find them correctly recorded by Fowler²³⁹. The type of Scarus franus Fowler²⁴⁰, upon comparison, proves to be a synonym of C. globiceps.

²³⁷.

Proc. Acad. Nat. Sci. Phila., 1900, p. 527.

²³⁸

Journ. Mus. Godeffroy, vol. 16, heft 8, 1909, p. 318.

²³⁹ L.c. 1

²⁴⁰ L.c., 1899, p. 490, pl. 18, fig. 3. Thornton Island.

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Callyodon pectoralis (Valenciennes).

Fig. 280.

Painting of an example caught in
Sand Island - August 29, 1840. Fiji,
by J. Drayton.

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Callyodon
Pseudoscarus jordanii (Jenkins).

Head $2 \frac{4}{5}$; depth $2 \frac{4}{5}$?; D. IX, 10; A. III, 9; scales 18 in upper section of lateral line, 5 in lower section to caudal base and 2 more on latter; 2 scales above lateral line to spinous dorsal origin, 2 to soft dorsal origin, 6 below to spinous anal origin; snout $2 \frac{1}{4}$ in head; eye 7; mouth 5; interorbital $3 \frac{1}{6}$; head width $2 \frac{1}{2}$. Snout conic, width $1 \frac{1}{4}$ its length. One small upper canine each side posteriorly. Scales with 31 basal striae, 60 apical; 3 rows of cheek scales, lowest in preopercle flange; tubes fine in lateral line, each with several branches, which may have 2 to 4 branchlets. Caudal strongly lunate and points long, hind edge rather broadly pale. Color in alcohol pale or dull brownish generally. Traces of pale streak from near nictus toward eye. Margins of dorsals and anals dark. Length 401 mm. of skinned fish. Bellinghausen Island, Society Islands.

Jenkins figures the type with 3 rows of cheek scales, and smaller eye. He shows the upper section of the lateral line connected with the lower section by 2 intervening arborescent scales. Jordan and Evermann's figure shows a non-tubular intervening scale

241 Bull. U.S. Fish Com., vol. 23, pt. 1, 1903 (1905), p. 358,
Pl. 44.

GOBIIDAE.

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Eleotris fusca (Schneider). *Fig. 377.*

Head $2 \frac{7}{8}$ to 3; depth 5 to $5 \frac{1}{5}$; D. VI-1,8,1; A.I, 7, 1; scales 52 to 65 from gill-opening to caudal base and 7 or 8 more on latter; 14 to 16 scales transversely between soft dorsal origin and anal origin; 40 to 55 predorsal scales; snout $3 \frac{7}{8}$ to $4 \frac{2}{3}$ in head from upper jaw tip; eye $4 \frac{2}{3}$ to $5 \frac{7}{8}$; maxillary $2 \frac{1}{3}$ to $2 \frac{3}{4}$; interorbital $3 \frac{1}{2}$ to $3 \frac{4}{5}$; head width $1 \frac{3}{4}$ to $1 \frac{7}{8}$ in total head length. Snout length $1 \frac{1}{2}$ to 2 in its width. Maxillary to hind pupil edge, to front pupil edge in young, narrow. Teeth fine, in bands in jaws, outer row enlarged. Tongue rounded in front.

Interorbital slightly convex. Rakers 1 8, lanceolate, equal filaments 2 in eye. Scales with 24 to 26 basal radiating striae; apical denticles, when present, about 50; circuli fine. Color in alcohol dusky-brown, generally uniform. Fins dark, and most with fine darker lines longitudinally on dorsals and anals, and transversely on caudal. Length 60 to 112 mm. Three from Fiji, and 5

without data, likely from Samoa? *Three drawings, 1 Samoa, 1 Fiji and 1 fresh-water of Tahiti.*
Eleotris sandwicensis Vaillant and Sauvage. *Fig. 378.*

Head $2 \frac{3}{4}$ to $3 \frac{1}{5}$; depth 4 to $4 \frac{7}{8}$; D.VI - 1; A.1, 8, 1; scales 73 to 80 from gill-opening to caudal base and 7 or 8 more on latter; 20 to 25 scales transversely from soft dorsal origin; predorsal scales 60 to 70; snout 4 to $4 \frac{1}{3}$ in head from upper jaw tip; eye $5 \frac{2}{5}$ to $6 \frac{3}{4}$; maxillary $2 \frac{1}{4}$ to $2 \frac{1}{2}$; interorbital $3 \frac{2}{5}$ to $3 \frac{4}{5}$; head width $1 \frac{3}{5}$ to $1 \frac{3}{4}$ in total head length. Snout length $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in its width. Maxillary to hind pupil edge; expansion $2 \frac{1}{4}$ in eye in adult. Bands of fine teeth in jaws, and outer row little enlarged in smallest example. Tongue rounded in front. Interorbital very slightly convex or nearly level. Rakers 3+6, lanceolate, about half of filaments and latter $1 \frac{2}{5}$ in eye. Scales with 16 to 24 basal radiating striae; apical denticles 45 to 62; circuli fine. Color like that of E. fusca, even to dark longitudinal lines on fins. Length 74 to 158 mm. One from Oahu, and 5 others without data, doubtless Hawaiian?

Very close to the preceding species. Our material shows one more anal ray and smaller scales in a lateral series.

Five drawings, unsigned, 1 from fresh water of Maui, 1 without locality, 2 Oahu and 1 Hilo. Also painting by Drayton of example from Tahiti, September 1839.

Butis butis (Buchanan-Hamilton). *Fig. 379.*

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth $4 \frac{1}{8}$ to $5 \frac{1}{3}$; D. VI - i, 9, i or i, 8, i; A. i, 8, i; P.i, 18 or 19; large scales (not counting auxillary basal scales) 30 from gill-opening to caudal base and 5 more on latter; 10 or 11 scales transversely between soft dorsal origin and anal origin; 35 to 50 predorsal scales; snout $2 \frac{2}{5}$ to 3 in head from upper jaw tip; eye $4 \frac{4}{5}$ to $6 \frac{1}{4}$; maxillary $2 \frac{1}{3}$ to $2 \frac{1}{2}$; interorbital $3 \frac{7}{8}$ to 4; head width 2 to $2 \frac{1}{8}$ in its total length. Snout with slight convex prominence forward, length 1 to $1 \frac{1}{2}$ its width. Maxillary to first fifth or middle in eye; expansion 2 to $2 \frac{1}{4}$ in eye. Teeth fine, in bands in jaws. Tongue slightly emarginate in front. Rakers iii I+6, lanceolate, short, longest half of filaments, which $1 \frac{1}{2}$ in eye. Scales crowded forward, where fine, also on top of head; 11 scale rows in cheek to preopercle ridge; fine scales on head below and breast; 13 to 15 striae on scales; apical denticles 45 45 to 55 55; circuli fine. Color in alcohol faded dull brown generally. Sides with 10 longitudinal dark brown lines. Pectoral base with blackish blotch little smaller than eye, above and below which slightly smaller white blotch. Soft dorsal and anal with alternate deep brown to whitish lines. Spinous dorsal dusky. Length 90 to 127 mm. Three from Singapore.

Asterropterix semipunctatus Rüppell.

Head 3; depth $4 \frac{3}{5}$; D. VI - I, 9, i; A. I, 9, i; scales 28? from gill-opening to caudal base and 2 more on latter; 10 scales transversely between soft dorsal and anal origins; snout

conic, length $4/5$ its width. Maxillary to eye, narrow. Teeth strong, moderate, in front of jaws, uniserial, smaller on sides of back. Tongue rounded, free. Interorbital narrow bony ridge. Rakers about 15 short rudimentary points, greatly shorter than filaments, which 2 in eye. Sides and top of head evidently scaly (now naked) and scales about ventral and below pectoral much smaller than elsewhere; 15 or 16 basal radiating striae on scales; apical denticles 26 to 30; circuli coarse. Color in alcohol dull uniform brown. Traces of several transverse dark cross-bars on caudal. Length 30 mm. One from Maui.

Rüppell's original figure²⁷⁵ shows a very long spinous dorsal, also ventrals reaching beyond anal origin, both characters not found in our example. No marginal preopercle spines are shown, whereas our example has 5 rudimentary points. Rüppell also gives 12 soft dorsal rays.

Jordan and Seale figure a Samoan example²⁷⁶ with 2 rather strong preopercular spines. Our example shows very much smaller scales on the breast than their figure gives.

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Atlas Reis. Naval Af., Fische, 1828, p. 138, Pl. 34, fig. 4, Massana.

276. Bull. Bur. Fishes, vol. 25, 1905(1906), p. 385, Pl. 36, fig. 1.

Ophiocara porocephala (Valenciennes). *Fig. 380.*

Head 3 to $3 \frac{1}{8}$; depth 4 to $4 \frac{2}{5}$; D. VI - I, 8, 1; A. I, 9, 1; scales 30 to 32 from shoulder to caudal base medially; 12 scales transversely from soft dorsal origin to anal origin; 20 to 24 predorsal scales; snout $3 \frac{2}{5}$ to $3 \frac{7}{8}$ in head from upper jaw tip; eye $5 \frac{1}{5}$ to $6 \frac{1}{3}$; maxillary $2 \frac{7}{8}$ to 3; interorbital $2 \frac{1}{8}$ to $2 \frac{5}{6}$; head width $1 \frac{3}{5}$ to $1 \frac{7}{8}$ in total head length. Snout broadly convex, length $1 \frac{1}{2}$ to $1 \frac{3}{5}$ its width. Maxillary to pupil; expansion 3 to $3 \frac{1}{2}$ in eye. Teeth fine, in bands in jaws, outer row enlarged. Tongue rounded in front. Interorbital broad, depressed level. Rakers ~~3~~ 14, lanceolate, 2 in filaments, which $1 \frac{1}{2}$ in eye. Scales with 20 to 23 basal radiating striae, median extending well apically; apical denticles 106 to 123; circuli fine. Color in alcohol deep sepia-brown, with obscure darker longitudinal streaks on sides and back, those on head all finer. Fins all brownish like back, soft dorsal and anal broadly bordered whitish and also some dark blotches on fin membranes. Dark spot at pectoral base medially. Length 145 to 187 mm. Three from Fiji.

Gobiomorphus gobioides (Valenciennes). *Fig. 381.*

Head 3 to $3 \frac{1}{5}$; depth $4 \frac{3}{4}$ to 5; D. VI or VII - I, 8, 1 to 10, 1; A. I, 8, 1, to 10, 1; scales 35 to 43 from shoulder to caudal base and 4? more on latter; 12 scales transversely between soft dorsal and anal origins; 15 to 19 predorsal scales;

snout $3 \frac{3}{4}$ to 4 in head from upper jaw tip; eye $3 \frac{3}{5}$ to $5 \frac{1}{8}$; maxillary $2 \frac{1}{2}$ to $3 \frac{1}{8}$; interorbital 3 to 5; head width $1 \frac{4}{5}$ to 2 in total head length. Snout convex, length $1 \frac{1}{6}$ to $1 \frac{1}{5}$ its width. Maxillary to eye; expansion 3 in eye. Teeth fine, in bands in jaws. Tongue convex in front. Interorbital broadly concave. Rakers 29, small, lanceolate though thick, $2 \frac{1}{2}$ in filaments and latter $1 \frac{4}{5}$ in eye. Scales with 23 to 32 basal radiating striae; apical denticles 88 to 112; circuli fine. Color in alcohol dark brown, fins dusky to blackish. Spinous dorsal with 4 deep brown horizontal lines and 5 or 6 on soft dorsal. Blackish blotch at pectoral base above, in smaller example distinct. Length 117 to 148 mm. Two without locality, doubtless

from New Zealand! *Painting by Doughton of an example labeled Bay of Islands, March 1840, but without ventrals.*

Bathygobius fuscus (Rüppell). Fig. 382.
Three drawings, unsigned, each from
Nauri, Fiji and Tongatabu.

Gobius ornatus Rüppell. Fig. 383.
Three unsigned drawings of Fiji examples.

Periophthalmus koebrenneri (Pallas). Fig. 384

Head $3 \frac{1}{3}$ to $3 \frac{4}{5}$; depth $4 \frac{3}{5}$ to $4 \frac{3}{4}$; D. XIII - I, 11,
1; A. I, 9, 1 or 10, 1; scales 76 to 78 from gill-opening to caudal
base medially; 23 or 24 scales transversely between soft dorsal and
anal origins; 36 to 40 predorsal scales; snout $2 \frac{3}{5}$ to $3 \frac{1}{8}$ in
head; eye $3 \frac{3}{4}$ to 4; maxillary $2 \frac{2}{5}$ to $2 \frac{1}{2}$; head width $1 \frac{1}{3}$
to $1 \frac{3}{5}$. Snout convex, length about $\frac{3}{5}$ to $\frac{3}{4}$ its width. Max-
illary to eye center. Teeth strong, conic, uniserial in jaws. In-
terorbital simply narrow ridge. Rakers 5 + short weak points, much
shorter than filaments, which about equal eye. Scales with 32 to
35 marginal parallel striae; circuli 10 to 12. Color in alcohol
dull sepia on back and above, paler below. Upper surface and
sides all more or less mottled paler and darker. Dorsal blackish-

brown, edge narrowly white, and hind half thickly dotted with white. Soft dorsal with basal half obliquely blotched deep dusky to brownish, black on paler ground-color, and outer half as broad submarginal dusky-sepia band edged broadly with whitish and upper of edges forming fin edge. Caudal pale brown with about 7 transverse darker streaks. Pectoral somewhat similar to caudal, only paler. Ventral pale brown, with 2 obsolete deeper brown cross-bands, edge narrowly pale to whitish. Anal whitish. Length 93 to 103 mm. Six from Fiji.

Garmannia hemigymna(Eigenmann and Eigenmann).

Head 3 to $3 \frac{1}{6}$; depth 4 to 5; D. VII- 12 or 13; A. 10; scales 38 or 39 from near pectoral axil to caudal base, of which about 24 from opposite soft dorsal origin to caudal base, and 2 more on latter; 5 or 6 scales transversely opposite soft dorsal origin; 10 scales across caudal peduncle transversely; snout $3 \frac{3}{4}$ to $4 \frac{2}{3}$ in head; eye $3 \frac{1}{3}$ to $3 \frac{7}{8}$; maxillary $2 \frac{1}{4}$ to $2 \frac{2}{5}$; interorbital $2 \frac{1}{4}$ to $2 \frac{1}{3}$ in eye; head width $1 \frac{2}{3}$ to $1 \frac{4}{5}$ its length. Snout convex, length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Maxillary little behind pupil, but not quite to hind eye edge. Lower jaw slightly shorter than upper. Teeth conic, large rather strong, uniserial above, biserial below, with inner row little larger and fewer. Tongue truncate. Interorbital very narrow, nearly level. Rakers 2+8, lanceolate, nearly long as filaments, which about $\frac{2}{3}$ of eye. Scales mostly on posterior half of body, extend forward over costal region to pectoral axil and not along upper and lower body edges at front of soft dorsal and anal; radiating

basal striae 9 to 16; apical denticles 10 to 12; circuli coarse. Color in alcohol dull uniform brownish with faint dark mottlings on back and on fins terminally, which latter pale otherwise. Length 28 to 30 mm. Two from Rio Janeiro.

This species only known previously from the original description, the exact locality unknown, but believed to be somewhere in the West Indies. The type is 44 mm. long, and is described with fewer fin-rays than in our material.

Mugilogobius devisi McCulloch and Ogilby.

Head $3 \frac{3}{4}$; depth 5; D. VI - I, 9?; A.I, 8; scales about 48 from shoulder to caudal base; about 14 scales transversely at soft dorsal and anal origins; snout $4 \frac{1}{8}$ in head; eye $4 \frac{1}{8}$; maxillary $2 \frac{1}{4}$; interorbital 3; head width $1 \frac{3}{5}$. Snout conic, length about half its width. Maxillary to hind eye edge. Teeth in bands in jaws, lower inner row little enlarged. Interorbital nearly level, scarcely convex. Gill-opening forward to hind preopercle edge. Scales smaller anteriorly, more distinctly ctenoid on caudal peduncle. Color in alcohol faded dull uniform brownish. Length 32 mm. One from Australia.

Our example, though in poor preservation, and smaller than that figured by McCulloch and Ogilby²⁷⁷, largely agrees.

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Records Austral. Mus., vol. 12, no. 10, 1919, p.223. Pl. 36, fig. 2. Moreton Bay.

Glossogobius giurus (Buchanan-Hamilton). *Fig. 325.*

Head $2 \frac{5}{6}$; depth $6 \frac{1}{3}$; D. VI - I, 8, 1; A.I, 8, 1; scales 30 from shoulder to caudal base and 3? more on latter; 9 scales

transversely between soft dorsal and anal origins; 25 predorsal scales; snout $3 \frac{1}{4}$ in head from upper jaw tip; eye 6; maxillary $2 \frac{1}{2}$; interorbital $7 \frac{2}{5}$, head width $2 \frac{1}{6}$. Snout with convex prominence, length $\frac{5}{6}$ its width. Outer row of teeth in each jaw strong, firm, conic, largest, and inner row more slender, depressible. Tongue emarginate in front. Bony interorbital very slightly concave. Vakers II IX, low rudiments; filaments $1 \frac{1}{2}$ in eye. Scales crowded in predorsal, especially forward, likewise on breast; median striae 25 to 31; apical denticles 100 to 120; lateral circuli moderate, much more numerous transversely over striae. Color in alcohol dull brownish, nearly uniform. Dorsals and caudal membranes with brownish spots. Length 218 mm. Manila.

Paragobiodon echinocephalus (Rüppell).

Head $3 \frac{1}{8}$; depth $2 \frac{3}{4}$; D.VI - I, 9, i; A. I, 9, i; scales 25 from gill-opening to caudal base; 11 scales transversely, between soft dorsal and anal origins; snout $2 \frac{2}{5}$ in head; eye 3; maxillary $2 \frac{1}{4}$; interorbital 3; head width $1 \frac{1}{3}$. Snout convex, length $\frac{2}{3}$ its width. Maxillary reaches eye. Tongue rounded in front. Teeth in bands in jaws, fine; pair of strong inner canines at front of lower jaw. Scales with 15 or 16 basal radiating striae; 24 to 40 apical denticles; circuli moderate. Length 21 to 28 mm. Two from

Fiji, the notes above pertaining to the larger example. *Painting by Drayton of an example from Vavua, Fiji, May 30, 1840.*

Ruppellia lacunicola Kendall and Radcliffe²⁷³ appears to be simply a variant. Its darker fins, fewer flaps and absence of papilla, besides its dimensions (about the size of our larger example), point to this view.

278. Mem. Mus. Comp. Zool., vol. 26, part 7, 1911, p. 318, Pl. 6, fig. 1
Fakarava, Pamotu Islands.

Cryptocentrus arabicus (Gmelin).

Head $5 \frac{1}{3}$; depth 7; D. VI - I, 12, 1; A. I, 11; P. 18; scales 85 from shoulder to caudal base and 5 more on latter; 19 scales transversely between soft dorsal and anal origins; 31 predorsal scales; snout $3 \frac{2}{5}$ in head; eye $4 \frac{2}{5}$; maxillary $2 \frac{1}{5}$; interorbital $7 \frac{1}{2}$; head width $1 \frac{5}{6}$. Snout convex, about wide as long. Maxillary to hind eye edge; expansion $2 \frac{3}{4}$ in eye. Teeth conic, biserial, outer row enlarged. Tongue emarginate in front. Narrow interorbital concave. Rakers 8-10?, lanceolate, slender, $2 \frac{3}{4}$ in filaments, which equal eye. Scales with 13 to 24 basal radiating striae; apical denticles 40 to 60; circuli moderate. Second and third dorsal spines nearly twice body height. Color in alcohol faded dull brownish, mostly uniform. Length 140 mm. One without locality, though possibly from somewhere in the Indian Ocean, likely Ceylon?

Our specimen agrees largely with Gunther's Gobius arabicus²⁷⁹. He says head high as broad, whereas in our example the head height is $\frac{3}{4}$ its width. He also says canine teeth are present in both jaws. In our example the outer teeth are greatly larger than the inner and may be styled canines.

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Cat. Fishes Brit. Mus., vol. 3, 1861, p. 75.

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Lentipes seminudus Günther. *Fig. 386.*

Head $4 \frac{3}{5}$ to $4 \frac{2}{3}$; depth $6 \frac{1}{4}$ to $6 \frac{3}{5}$; D. VI - I, 10, 1; A. I, 10, 1; snout 3 to $3 \frac{1}{4}$ in head; eye 4; maxillary $2 \frac{1}{10}$ to $2 \frac{1}{8}$; interorbital $3 \frac{1}{5}$ to $3 \frac{1}{4}$; head width $1 \frac{2}{5}$ to $1 \frac{1}{2}$. Snout convex, length $1 \frac{1}{2}$ to $1 \frac{2}{3}$ its width. Maxillary to eye center, not quite to hind eye edge in smaller example. Teeth above trifid, with median point largest; small, even, more conspicuous than in Sicyopterus stimpsoni; lower teeth larger and fewer, uniserial, conic, also outer row (damaged) of small movable setiform teeth at front at least. Tongue thick, rounded in front. Interorbital level. Rakers 1 1, rudimentary joints; filaments slightly longer than eye. Body naked, except few scales on trunk posteriorly; and on caudal peduncle; scales with 16 to 18 basal marginal parallel striae; circuli coarse. Color in alcohol mummy-brown to cinnamon-brwn. Fins dull brown. In smaller example spinous dorsal dusky and white edged with dusky submarginal streak. Length 63 to 84 mm. Two from Maui, and a third likely wrongly labeled "Manila", as it very probably was obtained at Maui also.

Sicyopterus stimpsoni (Gill). *Fig. 387.*

Head $3 \frac{4}{5}$ to $4 \frac{2}{5}$; depth $4 \frac{1}{2}$ to $5 \frac{2}{5}$; D. VI - I, 10, 1; A. I, 10, 1; scales 74 to 83 from gill-opening to caudal base medially; 16 or 17 scales transversely between soft dorsal and anal origins; 38 to 42 predorsal scales; snout $2 \frac{2}{3}$ to $2 \frac{4}{5}$ in head; eye $4 \frac{4}{5}$ to $6 \frac{1}{8}$; maxillary 2 to $2 \frac{1}{5}$; interorbital $2 \frac{7}{8}$ to $3 \frac{1}{2}$; head width $1 \frac{1}{3}$ to $1 \frac{2}{5}$. Snout obtuse, convex, length $1 \frac{1}{3}$ to $1 \frac{1}{2}$ its width. Maxillary to pupil, reaches hind pupil

edge in younger examples. Teeth above bifid, fine, even, close set, in single row, concealed in gums; inner lower teeth large, few, from single row of simple, erect, conic canines and outer teeth as fine, movable setiform row in lip. Tongue thick, rounded. Interorbital level, to very slightly depressed. Rakers 1 1, vestigeal tubercles; filaments about twice eye. Scales fine and crowded on predorsal and caudal base; 9 to 16 basal radiating striae; 16 or 17 apical denticles; circuli coarse and mostly basal. Color in alcohol umber-brown, scarcely paler below. Dorsals and anals dusky to blackish, also median caudal rays. Soft dorsal and anal broadly bordered whitish, and together with caudal all with many small whitish round spots. Length 67 to 119 mm. One

from Oahu, 3 from Maui and 6 from Hilo. *Seven drawings, inscribed, of which 1 from Maui, 1 Hilo, 1 Hawaiian Islands and 1 Honolulu in 1840.*
Sicyopterus taeniurus. (Günther). Fig. 388.

Head 4 to 4 $\frac{2}{5}$; depth 4 $\frac{7}{8}$ to 5 $\frac{1}{4}$; D. V - I - I, 11, 1 or 12, 1; scales 50 to 60 from gill-opening to caudal base and 5 to 8 more on latter; 16 or 17 scales transversely between soft dorsal and anal origins; 15 to 17 predorsal scales; snout 3 to 3 $\frac{1}{2}$ in head; eye 3 $\frac{1}{2}$ to 5 $\frac{1}{2}$; maxillary 2 to 3; interorbital 2 $\frac{1}{2}$ to 3; head width 1 $\frac{2}{5}$. Snout convex, length 1 $\frac{3}{4}$ its width. Maxillary to hind eye edge. Teeth as in S. stimpsoni, except lower canines or inner row of larger teeth directed laterally, forward ones little enlarged. Tongue thick, rounded. Interorbital level. Rakers not developed; filaments slightly larger than eye. Scales with 15 to 18 basal radiating striae; long apical denticles 12 to 19; circuli numerous, basally, coarser above and below.

Color in alcohol umber brown, mostly uniform. Vertical fins dusky to blackish, soft dorsal and anal with pale margins, and latter with dusky submarginal streak. Series of 129 examples, mostly young, from Tahiti. *Two drawings from the fresh water of Tahiti.*

S. pugnax Ogilvie-Grant²⁸⁰ is a synonym. Its color pattern is similar to that of our largest example, though it has an abnormal spinous dorsal, the membrane of the sixth spine being entirely separated.

S. tanae Jordan and Seale²⁸¹ is another synonym, representing the young. Our large series covers such minor points as it exhibits. The coloration is precisely the same as that of our young examples. It should originally have been compared with S. taeniurus, as no reference to its relationship is made. Kendall and Goldsborough report S. taeniurus from Tahiti²⁸², and their account full agrees with our material.

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Proc.Zool.Soc., London, 1884, p. 160, Pl. 11. Savaii.

281

Bull. Bur.Fisher., vol.25, 1905, (1906), p. 410, fig. 96,
Vaisigano River, Apia.

282

Mem.Mus.Comp.Zool., vol.26, 1911, p. 323.

*Chonophorus**Awavus genivittatus* (Valenciennes). *Fay. 389*

Head $3 \frac{2}{3}$; depth $4 \frac{1}{2}$ to 5; D. VI - I, 11, 1; A. I, 11, 1; scales 48 to 50 from shoulder to caudal base medially and 4 or 5 more on latter; 12 scales between soft dorsal and anal origins; 15 to 20 predorsal scales; snout $2 \frac{7}{8}$ to $3 \frac{1}{8}$ in head from upper jaw tip; eye 5 to $6 \frac{1}{3}$; maxillary 2 to $2 \frac{1}{10}$; interorbital 6 to $6 \frac{3}{4}$; head width. Maxillary to hind eye edge, to hind pupil edge in smaller examples; expansion $1 \frac{1}{6}$ to $1 \frac{1}{4}$ in eye. Teeth conic, moderate, in bands in jaws; Tongue obtuse or truncate in front. Interorbital slightly convex. Rakers 2+4, very short rudimentary tubercles; filaments $1 \frac{1}{5}$ in eye. Scales with 16 to 30 marginal parallel basal striae, 3 auxillaries or 18 striae basally; apical denticles 45 to 78; circuli fine basally, coarser apically.

Color in alcohol faded dull brownish, each scale with narrow deep brown streak basally, Side with traces of about a dozen dusky vertical streaks or narrow bars. Dusky band from lower eye edge down across cheek close behind maxillary, where it widens, to lower portion of preopercle. Spinous dorsal pale brown, with narrow waved brown lines sub-marginally on membranes. Soft dorsal pale, with irregular deep brown waved, though mostly vertical, lines in membranes between and parallel with rays. Anal similar, only dark vertical streaks on membranes broader and more regular. Caudal pale brown, faintly and finely cross-barred. Other fins all pale brown. Length 105 to 138 mm. Four from Oahu and one from Maui.

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Chonophorus

Avavus stamineus (Eydoux and Souleyet). *Fig. 340 and 391.*

Head $2 \frac{9}{10}$ to $3 \frac{2}{5}$; depth $4 \frac{4}{5}$ to $5 \frac{2}{5}$; D. VI, once V-I, 10, 1; A. I, 10, 1; scales 62 to 71 from shoulder to caudal base medially and 5 to 7 more on latter; 19 or 20 scales transversely between soft dorsal and anal origins; 34 to 40 predorsal scales; snout $1 \frac{3}{4}$ to $2 \frac{7}{8}$ in head; eye $5 \frac{1}{5}$ to $7 \frac{1}{8}$; maxillary $1 \frac{3}{4}$ to $2 \frac{1}{3}$; interorbital 5 to $6 \frac{1}{5}$; head width $1 \frac{3}{4}$ to $1 \frac{7}{8}$. Snout broadly convex, long as wide. Maxillary to hind eye edge, to front pupil edge in young; expansion $1 \frac{1}{4}$ to 2 in eye. Teeth small, in bands in jaws. Tongue emarginate in front. Interorbital little concave. Rakers 3+4 short points, about $2 \frac{1}{2}$ in filaments, latter slightly longer than eye. Scales with 11 to 16 basal radiating striae; 37 to 54 apical denticles; circuli moderately fine. Color in alcohol dull brownish, with about 6 to 9 transverse waved dark bars and caudal rays similarly marked with about a dozen such bars. Spinal dorsal sometimes dark, especially marginally, often with 8 or 9 oblique dark lines. Length 95 to 260 mm. One from Manila, 3 from Oahu, 1 from Hilo and one without locality. *Three drawings, 1 from example from Hilo, 1 from Maui and 1 Oahu.*

ECHENEIDIDAE.

Echeneis remora Linnaeus.

One from Hull's Sound, one from Pomoton, one from Hull's Island, two from Lat. S. 28 and W. 45 , and 3 from Cape Verde Island. Length 73 to 153 mm. Our material shows usually 18 dorsal lamellae, frequently 17 and rarely 19. Compared with an example of Rhombochirus tetrapturorum Poey, from Florida and now in the Academy, the present species differs chiefly in its larger eye. In Rhombochirus the pectoral rays are quite stiff and rigid, though in Echeneis only about outer half of fin is flexible. All our examples of E. remora are a dull uniform brown, the lower surface not paler. In R. tetrapturorum the coloration is strikingly variegated.

Cottoperca gobio (Günther).

Head $2 \frac{2}{5}$ to $2 \frac{3}{5}$; depth $4 \frac{2}{3}$ to $4 \frac{7}{8}$; D. VII - I, 21 or 22; A. 20 to 22; scales 50 in lateral line to caudal base; 10 scales above lateral line to soft dorsal origin, 14 below to anal origin; 8 predorsal scales to occiput; snout $3 \frac{2}{5}$ to 4 in head; eye $4 \frac{2}{3}$ to $6 \frac{1}{8}$; maxillary 2; interorbital 2 to $2 \frac{1}{4}$; in eye. Head width $1 \frac{7}{8}$ to 2 in head length. Snout convex, length $\frac{3}{4}$ its width. Eye slightly impinging on upper profile, $1 \frac{1}{8}$ to $1 \frac{2}{3}$ in snout. Mouth large, lower jaw very slightly protrudes. Maxillary reaches slightly behind eye; expansion $1 \frac{7}{8}$ in eye. Teeth conic, simple, in bands in jaws, on vomer and palatines. Interorbital deeply concave. Rakers IV+IX, obtuse tentacles, largest about half of filament, which 2 in eye. Scales with radiating basal striae 12 to 24; apical denticles 28 to 32; circuli coarse. Color in alcohol uniform warm sepia-brown. Length 120? to 315 mm. (caudal damaged). Five from Orange Harbor, Tierra del Fuego.

Though in rather poor preservation our examples agree with Regan's figure and description.²⁸⁵ Our largest specimen shows about 14 rows of scales across the cheek from lower eye edge to middle of preopercle edge, and also a number of fine crowded scales along upper part of opercle or above opercular spine.

C. macrocephala Roule is said to have 7 simple pectoral rays, but this must be a variable character as our specimens of C. gobio show 3 to 6, of which lesser numbers in the young, except one small specimen which also has 7.

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Tr. Roy. Soc. Edinburgh, vol. 49, part 2, 1913, p. 253, Pl. 4, fig. 3

NOTOTHENIIDAE.

Notothenia cornucola Richardson.

Head $3 \frac{1}{5}$ to $3 \frac{2}{5}$; depth 4 to $4 \frac{2}{5}$; D. V, 30 to 32; A. 30 to 32 scales 44 to 47 in lateral line to caudal base; 50 to 52 rows of scales along lateral line to caudal base; 4 scales above lateral line to soft dorsal origin, 13 to 14 below to anal origin; 14 predorsal scales to occiput; snout $3 \frac{1}{2}$ to 4 in head from upper jaw tip; eye 4 to $4 \frac{1}{5}$; maxillary $2 \frac{2}{5}$; interorbital $1 \frac{4}{5}$ in eye. Head width $1 \frac{2}{3}$ in its total length. Snout length $\frac{3}{4}$ its width. Eye with hind edge well advanced from middle in head length. Mouth moderate, lower jaw slightly projecting. Maxillary to pupil, expansion $2 \frac{1}{5}$ in eye. Teeth biserial, rows slightly irregular, front one longest, strongest and curved. Interorbital narrow, level.

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Rakers 9 12, lanceolate, $2/5$ of filament, which $1 \frac{1}{2}$ in eye. Scales with 10 to 11 basal radiating striae; apical denticles 12 to 14. Color in alcohol uniform brownish. Length 50? to 104? (caudal damaged). Twelve from Tierra del Fuego.

Notothenia squamiceps Peters.

Head $3 \frac{1}{5}$?; depth $4 \frac{1}{4}$?; D. V - 28; A. 28; 6 scales above lateral line to soft dorsal origin; 15 predorsal scales to occiput; snout 4 in head from upper jaw tip; eye $4 \frac{2}{3}$; maxillary $2 \frac{2}{5}$; interorbital 4. Head width $1 \frac{2}{5}$ in its total length. Snout convex, length about $3/4$ its width at front of eyes. Eye slightly advanced from middle in head length. Mouth large, jaws even. Maxillary to pupil; expansion 2 in eye. Teeth in bands in jaws, outer row enlarged. Interorbital broad, level. Rakers 11 15, about $2/5$ of filaments, which $1 \frac{1}{3}$ in eye. Scales with 10 basal radiating striae; apical denticles 25 to 30, strong; circuli rather coarse. Color in alcohol dull uniform brownish. Length about 95? mm. One in poor condition, from Tierra del Fuego.

Notothenia tessellata Richardson.

Head $3 \frac{1}{8}$ to $3 \frac{2}{5}$; depth $4 \frac{3}{5}$ to 6; D. VI or VII - 32 to 34; A. 32 or 33; scales 48 to 50 in upper lateral line to caudal base; 78 to 80 rows of scales along and close above lateral line to caudal base; 5 scales above lateral line to soft dorsal origin, 20 or 21 below to anal origin; 42 to 56 predorsal scales to snout, 18 to 20 to occiput; snout $3 \frac{7}{8}$ to 4 in head from upper jaw tip;

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eye $4 \frac{2}{3}$ to 5; maxillary $2 \frac{2}{5}$; interorbital $1 \frac{2}{3}$ in eye. Head width $1 \frac{2}{3}$ its total length. Snout convex, length $\frac{3}{4}$ width at eye front. Eye with hind edge midway in head. Mouth large, lower jaw projecting. Maxillary to first $\frac{2}{5}$ in eye; expansion 2 in eye. Teeth biserial, outer row larger, rather irregular, curved, inner row partly biserial? Interorbital concave. Rakers 9 to ~~11~~ 13 to 15, lanceolate, $1 \frac{1}{2}$ to $1 \frac{5}{6}$ of filaments, which $1 \frac{2}{3}$ to $1 \frac{3}{4}$ in eye. Scales with 12 to 14 basal radiating striae, circuli coarse. Color in alcohol faded dull brown. Length 65 to 168 mm. (caudal damaged). Nine from Orange Harbor, Tierra del Fuego. Several of these examples in very poor condition.

Notothenia longipes Steindachner.

Head $3 \frac{2}{5}$ to $3 \frac{2}{3}$; depth $4 \frac{1}{2}$ to 5?; D. VI - 33 to 36; scales 48? to 50? in median lateral series to caudal base; 3 or 4 scales above lateral line to soft dorsal origin, 15 or 16 below to anal origin; 10 or 11 predorsal scales to occiput; snout $3 \frac{4}{5}$ to 4 in head; eye 4 to $4 \frac{2}{3}$; maxillary $2 \frac{3}{5}$ to $2 \frac{3}{4}$; interorbital 6? to $6 \frac{1}{2}$. Head width $1 \frac{4}{5}$ to in its length. Snout convex, length $\frac{7}{8}$ its width. Hind eye edge midway in head length. Mouth large, jaws even. Maxillary to pupil; expansion $2 \frac{1}{4}$ to $2 \frac{3}{4}$ in eye. Teeth in bands, outer series enlarged. Interorbital level. Rakers 9 or 10 14 or 15, lanceolate, $1 \frac{4}{5}$ to $2 \frac{1}{2}$ in filaments, which 2 to $2 \frac{1}{2}$ in eye. Scales with 10 to 14 basal radiating striae; apical denticles 30?; circuli coarse. Color in alcohol faded dull brown. Length 100 to 130? mm. (caudals mostly gone). Four from Tierra del Fuego, also one labeled Orange Harbor.

Eleginops maclovinus (Cuvier). *Fig. 404*

Head $3 \frac{1}{2}$; depth $4 \frac{1}{2}$; D.VIII - I, 25; A. I, 23; P.I, 21; scales 60 in lateral line to caudal base; 6 scales above lateral line to soft dorsal origin; 15 below to anal origin; 35 predorsal scales; snout $3 \frac{1}{3}$ in head from upper jaw tip; eye 7; maxillary $3 \frac{3}{4}$; interorbital $3 \frac{7}{8}$. Head width $1 \frac{3}{5}$ its total length. Snout convex, length $\frac{5}{6}$ its width. Hind eye edge half an eye-diameter before head center. Maxillary $\frac{3}{4}$ in snout; expansion 3 in eye. Single row of low uniform teeth in each jaw. Interorbital convex. Rakers 9 15, lanceolate, $3 \frac{1}{2}$ in filaments, which slightly more than eye. Scales with 32 or 33 basal radiating striae; apical denticles 48 to 50; basal circuli much finer than lateral; 14 rows of scales across cheek from eye to preopercle ridge. Color in alcohol dull uniform brownish, belly and under surfaces scarcely paler. Length 290 mm. Valparaiso. Also 2 young in very poor preservation; from Orange Harbor, Tierra del Fuego.

Harpagifer bispinis (Schneider). *Fig. 405.*

Head $2 \frac{2}{3}$ to $2 \frac{5}{6}$; depth $4 \frac{2}{5}$ to $4 \frac{3}{4}$; D.III or IV 23 to 25; A. 18 to 20; snout $3 \frac{4}{5}$ to 4 in head from upper jaw tip; eye 4 to 5; maxillary $2 \frac{3}{5}$ to 3; interorbital $4 \frac{2}{3}$ to 5. Head width $1 \frac{1}{8}$ to $1 \frac{1}{4}$ in its total length. Snout convex, length $\frac{3}{5}$ to $\frac{3}{4}$ its width. Eye impinging on upper profile, often with swollen supercilliaris; center near first third in head. Mouth large, lower jaw slightly protruding. Maxillary to pupil, or eye center; expansion $1 \frac{3}{4}$ to 2 in eye. Bands of small, simple, conic uniform teeth in jaws. Interorbital evenly concave. Opercle ends in large

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strong spine and subopercle with strong spine curved down inferiorly. Rakers vestigial, 2 3 obsolete tubercles; filaments $1 \frac{1}{3}$ in eye. Color in alcohol dull brownish, apparently little paler on belly and under surfaces. Fins, except uniform pale anal, all with general pale brownish color, barred with rich brown. Length 40 to 70 mm. (caudals mostly damaged). Twenty from Orange Harbor and 2 labeled Tierra del Fuego.

PERCOPHIDAE.

Percophis brasiliensis Quoy and Gaimard.

Head $3 \frac{5}{6}$; depth $2 \frac{7}{8}$ in head; D.VIII - 30; A. 37; scales 108 in lateral line to caudal base; 10 scales above lateral line to spinous dorsal origin, 21 below to anal origin; 68 predorsal scales to snout tip; snout $2 \frac{2}{3}$ in head from upper jaw tip; eye $6 \frac{1}{2}$; maxillary $2 \frac{3}{5}$; interorbital $1 \frac{1}{3}$ in eye. Head width $2 \frac{1}{5}$ its total length. Snout depressed, long as wide. Eye supero-lateral. Mouth moderate, lower jaw produced. Maxillary to first $\frac{2}{5}$ in eye; expansion 2 in eye. Teeth in jaws uniserial, moderate; 6 upper canines in front; below small pair of canines in front and 8 well-developed lateral canines; band of fine teeth across vomer and palatines, outer row on latter slightly enlarged. Interorbital level. Rakers ~~7~~ 17, slender, lanceolate, equal filaments or $1 \frac{2}{3}$ in eye. Scales in 18 rows across cheek to preopercle ridge; basal radiating striae 10; apical denticles about 25; basal circuli fine, and upper and lower marginal coarse. Color in alcohol dull uniform brownish. Length 280 mm. (Caudal damaged.)

PARAPERCIDAE
PTEROPSARIIDAE.

^A
Hyperphapercis new genus.

Type Hyperphapercis fijiensis new species.

Allied with Neopercis Steindachner, in the presence of palatine teeth, but differs in the last dorsal spines shorter than the median. With Parapercis it agrees in the deeply notched dorsal leaving the spinous and soft fin separated, and its form. From

Paraperics it differs in the presence of palatine teeth.

("ΥΙΙεppα, palate; Percis.)

~~Hyperphapercis fijiensis new species.~~

Hyperphapercis fijiensis new species.

Head $3 \frac{1}{5}$; depth $5 \frac{1}{8}$; D. V, 20; A. 18; P. 14; V. I, 5; tubular scales 47 in lateral line to caudal base and 2 more on latter; 3 scales above lateral line to soft dorsal origin, 11 below to anal origin; 7 predorsal scales; head width 2 in its length; mandible $2 \frac{2}{5}$; third dorsal spine $2 \frac{7}{8}$; fifth dorsal ray $1 \frac{7}{8}$; fifth anal ray $2 \frac{1}{6}$; least depth of caudal peduncle $2 \frac{4}{5}$; caudal $1 \frac{1}{4}$; pectoral $1 \frac{1}{3}$; ventral 1; snout $2 \frac{7}{8}$ in head from upper jaw tip; eye 3; maxillary $2 \frac{2}{3}$; interorbital $2 \frac{1}{2}$ in eye.

Body moderately elongate, well compressed, slight predorsal ridge and greatest depth apparently at front of anal. Caudal peduncle well compressed, length about $\frac{4}{5}$ its least depth.

Head conic, about wide as deep. Snout conic, length $\frac{7}{8}$ its width, profile nearly straight. Eyes super-lateral, center about midway in head length, equal snout. Mouth moderate, lower jaw slightly protrudes. Maxillary becomes little inferior behind, to front eye edge, width $1 \frac{1}{4}$ in pupil. Teeth fine, in bands in vomer, palatines and in jaws; latter with outer row enlarged, especially forward above, 2 or 3 medio-laterals and pair of lower front canines. Nostrils small, close together and front one at least little behind middle in snout length. Interorbital narrow, slightly concave. Preorbital width half of eye. Opercle with 2 broad

flat strong spines, upper large. Preopercle entire.

Gill-opening forward to hind eye edge, membranes forming narrow free fold across isthmus. Rakers II 1+7, lanceolate, about $1/3$ of filaments, which $1 \frac{7}{8}$ in eye. Pseudobranchiae long as gill-filaments. Branchiostegals 5.

Scales in even longitudinal rows parallel with lateral line, above its course, in horizontal rows below. Cheek with 6 rows of scales below eye. Scales with 9 short basal radiating striae; 33 to 36 apical denticles; circuli fine basally, coarse marginally above and below. Dorsals and anals scaleless. Caudal covered with small scales over its greater extent basally. Pectoral base scaly. Lateral line of simple well-exposed tubes.

Spinous dorsal begins opposite end of upper opercular spine, third spine longest and first longer than last. Soft dorsal inserted near first third in total length of fish and last ray reaches caudal base. Anal inserted slightly nearer snout tip than caudal base, last ray extended little beyond latter. Caudal truncate, corners angular. Pectoral nearly reaches anal origin, fin rounded. Ventral reaches little beyond front of anal or about to base of third ray. Vent close before anal.

Color in alcohol dull brown. Back above lateral line with rather coarse reticulations of darker and about a dozen obscure small dark brown saddles. Alternating on lower side medially 10 vertical deep brown cross-bars, narrowing below and several on costal region broadened above and with pale centers, all extending transversely across belly and lower surface. Dark line extends down across cheek and another behind eye along preopercle.

Opercle with brown blotch. Branchiostegals with alternate deep brown and white spots. Spinous dorsal with deep brown medially. Soft dorsal with dark saddles of back reflected on base of fin, which pale, otherwise its outer portion spotted with dull brown. Caudal with 4 or 5 irregular dark brown cross-bars. Pectoral and ventral with few irregular small pale brown spots.

Length 95 mm.

Type No. 82,928, U.S.N.Mus., Fiji. Wilkes Exploring Expedition.
(Named for the Fiji Islands.)

Parapercis hexophtalma (Cuvier). *Fig. 403.*

Head $3 \frac{2}{5}$ to $3 \frac{1}{2}$; depth $5 \frac{1}{4}$ to $5 \frac{2}{5}$; D. V, 21, I; A. 17, I; scales 59 to 62 in lateral line to caudal base and 4 or 5 more on latter; 6 scales above lateral line, 13 to 15 below; 12 to 14 predorsal scales; snout $2 \frac{2}{5}$ to $2 \frac{4}{5}$ in head from upper jaw tip; eye $4 \frac{3}{5}$ to 5; maxillary $2 \frac{1}{3}$ to $2 \frac{3}{5}$; inter-orbital 7 to 8; head width $1 \frac{1}{2}$ to $1 \frac{3}{4}$ in total head length. Snout depressed, length $\frac{5}{6}$ to $\frac{7}{8}$ its width. Eye median in head, supero-lateral, $1 \frac{2}{3}$ to 2 in snout. Maxillary not to eye, though little beyond hind nostril; expansion $2 \frac{1}{2}$ to 3 in eye. Teeth fine, in bands in jaws, outer upper row enlarged, also outer pair each side above, 3 lower laterals, and pair of lower canines each side; vomer with band of fine teeth, none on palatines. Interorbital level, narrow. Opercle ends above in moderate spine. Preopercle edge entire. Rakers 5+9, lanceolate, 3 in filaments, which $1 \frac{3}{4}$ in eye. Scales with 13 to 16 basal radiating striae;

apical denticles 43 to 45; basal circuli fine, upper and lower margins 30 to 32; cheek rows of scales 15 below eye; tubes in lateral line simple, well exposed.

Color in alcohol dull brown generally, little paler below. Side of body with 2 obscure longitudinal pale brown bands, which intersected by 8 vertical bars of similar color or tint, also width, and extend down on lower body surface. On back opposite pale interspaces brown bands give rise to 9 saddle-like rings, where an alternating pattern results. Pale blotches along middle of side, each with dark brown short horizontal bar, and lower pale blotches each with 1 to 3 vertical dark bars. Below lateral line, opposite anal, 3 or 4 blackish-brown white-edged ocelli. Side of head with 5 to 8 oblique whitish lines, last across opercle. White line horizontally above opercle with blackish ocellus medially and above another smaller ocellus. Spinous dorsal with blackish basal blotch to first 2 membranes, fin edge gray. Soft dorsal and anal whitish, former with 3 or 4 very contrasted blackish-brown round spots on each membrane, and fin with narrow pale brown submarginal band its whole length, bordered with darker line above and below. Anal with very pale gray basal longitudinal line and row of similar dark spots medially, one on each membrane. Caudal largely blackish medially, breaking into blackish spots around borders, which smaller, and gradually minute posteriorly on fin. Pectoral and ventral uniform dull brown. Iris brown. Length 205 to 230 mm. Three from Fiji.

Parapercis tetracanthus (Lacépède).

Head $3 \frac{1}{6}$ to $3 \frac{1}{4}$; depth $6 \frac{1}{6}$ to 7; D. IV, 20; A. I, 17; scales 60 or 61 in lateral line to caudal base; 7 scales above lateral line, 12 below; 10 to 12 predorsal scales; snout $3 \frac{1}{8}$ to $3 \frac{1}{4}$ in head, from upper jaw tip; eye $4 \frac{1}{2}$ to 5; maxillary $2 \frac{4}{5}$ to $2 \frac{7}{8}$; interorbital 2 in eye. Head width $1 \frac{5}{6}$ to 2 in its total length. Snout attenuated, depressed, length $\frac{7}{8}$ its width at front of eyes. Eye superior, hind edge slightly before middle in head length, $1 \frac{1}{2}$ in snout. Mouth moderate, lower jaw well protruded. Maxillary becoming inferior behind, narrow, reaches front pupil edge. Teeth in bands in jaws, and several canines in front, especially below; band of fine teeth on vomer, but none on palatines. Interorbital narrow, slightly concave. Opercle with broad, strong, flattened spine; subopercle edge serrate; wide-set short inconspicuous denticle along preopercle edge. Rakers 5+10, lanceolate, $2 \frac{1}{2}$ in filaments, which 2 in eye. Scales with 11 to 13 basal radiating striae basally; apical denticles 30 to 37; circuli fine basally and about 20 superior and 20 inferior marginally; 14 scales obliquely down from lower hind eye edge to preopercle angle marginally; lateral line median along side, of short, simple tubes.

Color in alcohol dull brown, mottled on back above. Along side medianly 9 whitish arcs, below each a whitish spot, and all along abdominal edge white blotch opposite each arc and this divided completely by darker color of back extending transversely on abdomen and under surface or as cross-bands. Head with 3 similar

dark cross-bands. Fins mostly pale, though dark obscure blotch on soft dorsal basally opposite each pale lateral arc. Caudal pale, with dusky spots, mostly basally or only transverse row irregularly submarginal, with outer half of median 2 rays and membranes each strongly contrasted white. Pectoral and ventral each with 3 transverse pale brown cross-bars. Length 130 mm to 135 mm. Two from Fiji.

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OPISTHOGNATHIDAE.

Gnathypops samoensis Fowler and Silvester.

Head $2\frac{1}{2}$; depth $3\frac{5}{6}$; D. VII, 18?; A. III, 16; scales 42 from shoulder to caudal base medially; 28 tubular scales in lateral line to below middle of soft dorsal; 4 scales above lateral line to spinous dorsal origin; 18 scales below lateral line to spinous anal origin; 33 predorsal scales; head width $2\frac{3}{4}$ its length. Rakers iv 2 + 7 iii. Scales with 9 to 11 basal radiating striae; apical denticles about 20. Color in alcohol faded

nearly uniform dull brown. Length 43 mm. Tahiti.

We have compared the above with the types and find them in agreement. They show scales with 7 to 15 basal radiating striae and apical denticles 34 to 40.

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Dactyloscopidae.

Gillellus australis Fowler and Bean.
Fig. 402.

Gillellus australis Fowler and Bean,
Proc. U. S. Nat. Mus., 63, 1923, p. 23.
Valparaiso, Chile.

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ACANTHOCLINIDAE.

Acanthoclinus littoreus (Schneider). *Fig. 411.*

Head $3 \frac{1}{5}$; depth $4 \frac{3}{5}$; D. XX, 4, I; A. IX, 4, I; median lateral line (incomplete) with 73 scales; 11 scales above median lateral line to superior lateral line, 11 below to inferior lateral line (above spinous anal base); about 17 predorsal scales to occiput; snout 6 in head from upper jaw tip; eye $4 \frac{7}{8}$; maxillary $2 \frac{1}{10}$; interorbital $1 \frac{3}{4}$ in eye; head width 2 in its total length.

Snout conic, length $\frac{3}{5}$ its width. Eye center at first fourth in head from snout tip. Mouth large, lower jaw well protruded. Maxillary extends beyond eye; expansion $1 \frac{1}{3}$ in eye. Teeth conic, simple, in bands in jaws, across vomer, palatines and tongue. Interorbital narrowly and slightly convex. Rakers V+IV, short points, several of longest little lanceolate; filaments $1 \frac{2}{3}$ in eye. Scales cycloid, with 6 to 8 basal radiating striae; circuli rather coarse apically, more basally, or about 34; lateral lines 3 on trunk posteriorly and 4 forward, as lowest forks opposite anal origin, thus 2 lateral lines extending along side of abdomen; scales in lateral line all large, also tubes, which wide and simple.

Color in alcohol bister generally, largely uniform. Membranes of both dorsals and anals darker than trunk, except membrane margins, which much paler. Obscure dark blotch on opercle about large as eye. From behind eye dark brown streak slopes up toward upper gill angle; another just above maxillary from hind eye edge toward chest. Length 110 mm. (caudal tips damaged).

The figure by Jenyns is quite crude. Our example shows the ventral inserted much further forward, or nearly opposite middle in exposure of opercle, eye long as snout and maxillary well extended beyond eye.

BLENNIIDAE.

Tripterygion nigripinne Valenciennes.

Head 3 to $3 \frac{1}{3}$; depth $4 \frac{1}{8}$ to $5 \frac{1}{3}$; D.VI-XIX, rarely XVIII, 13; A. II, 23, rarely 22 or 24; scales 57 to 60 in lateral series from gill-opening to caudal base and 3 or 4 more on latter; lateral line with 16 to 22 + 22 to 28 and 2 more on caudal base; 10 scales above lateral line to soft dorsal origin; 13 below to anal origin; snout 3 to 4 in head; eye 3 to $4 \frac{1}{3}$; maxillary $2 \frac{1}{5}$ to $2 \frac{2}{5}$; interorbital $1 \frac{4}{5}$ to $1 \frac{7}{8}$; in eye; head width $1 \frac{2}{5}$ to $1 \frac{2}{3}$ in its length. Snout length $1 \frac{1}{3}$ to 2 in its width at front of eyes. Bands of fine palatine and vomerine teeth; outer jaw teeth strong, uniserial, conic, uniform and inner band of small simple ones in front of each jaw. Fine fringe along each jaw edge. Interorbital narrow, slightly convex. Rakers 3 5 short points, greatly less than filaments, which half of eye. Scales with 10 to 12 radiating basal striae; apical denticles 35 to 38; circuli rather coarse; lateral line with only front section well developed far as depressed pectoral tip. Color in alcohol faded dull brown, paler below. Spinous dorsal blackish. Length 33 to 73? mm. Eight from New Zealand.

Myxodes viridis Valenciennes.

Fig. 412.

Head $4 \frac{2}{5}$; depth $4 \frac{2}{3}$; D. XXXV, 7; A. II, 24; P. 12; about 60 pores in lateral line; snout 4 in head from upper jaw tip; eye $4 \frac{1}{3}$; maxillary 3; interorbital $1 \frac{1}{4}$ in eye; head width 2 in its total length. Snout convex, length $\frac{7}{8}$ its width. Maxillary inclined vertically, about reaches eye. Each jaw with row of strong conic teeth, forward ones little larger; no teeth on palate. Interorbital narrowly convex. About 15 shorter, slender, lanceolate rakers, 2 in filaments. Body, not head and fins, covered with small cycloid scales, scarcely or not touching one another; about 24 marginally radiating striae and about 10 to 12 coarse circuli; arch of lateral line extends far as depressed pectoral, after which tubes well separated. Color in alcohol dull brownish-olive. Vertical fins darker marginally. Length 110 mm. One without locality, doubtless obtained at Valparaiso, or somewhere in Chili.

Lepisoma philippi (Steindachner).

Figs. 413 and 414.

Head $2 \frac{3}{4}$ to $3 \frac{1}{6}$; depth 3 to $3 \frac{2}{3}$; D. XIX, 13; A. II, 20; scales in 105 to 120 rows along and close above lateral line to caudal base; tubular scales 73 or 74 in lateral line to caudal base; 20 scales above lateral line to soft dorsal origin; 30 to 35 scales below lateral line to anal origin; snout $2 \frac{3}{5}$ to 3 in head; eye $5 \frac{1}{4}$ to $6 \frac{1}{5}$; maxillary $2 \frac{1}{10}$ to $2 \frac{2}{5}$; interorbital $6 \frac{1}{4}$ to $8 \frac{1}{5}$; head width $1 \frac{7}{8}$ to $1 \frac{9}{10}$. Snout

long as wide, surface convex. Band of fine palatine and vomerine teeth; outer jaw teeth strong, uniserial, conic. uniform and broad inner band of simple small conic teeth in front of each jaw.

Short cutaneous fringe on upper side of head. Rakers 4+9, strong, short, lanceolate, 3 in filaments, which equal eye. Scales cycloid, marginal radiating basal striae 17 to 26; circuli coarse. Color in alcohol umber brown, obscurely though finely dotted with deep brown, inclusive of fins. Length 218 to 245 mm. Four without

locality, though doubtless obtained in Peru? *Four drawings, inscribed, of which 2 without locality and 2 labeled Peru.*
Lepisoma nuchipinnis (Quoy and Gaimard).

Head $3 \frac{1}{3}$; depth $3 \frac{1}{5}$; D. XVIII, 13; A. II, 20; scales in 70 rows along and close above lateral line to caudal base; tubular scales 64 in lateral line to caudal base; 10 scales above lateral line to soft dorsal origin; 15 scales below to anal origin; snout $3 \frac{1}{3}$ in head; eye $5 \frac{1}{3}$; maxillary 2; interorbital 8; head width $1 \frac{2}{3}$. Rakers 3+6, lanceolate, 3 in filaments which nearly equal eye. Scales with 18 to 21 basal radiating striae; circuli rather coarse. Color in alcohol umber brown. Dark brown vertical blotch, narrower than eye, but equals eye in vertical diameter. Length 147 mm. Rio Janeiro.

Lepisoma guttulata (Valenciennes). *Fig. 415.*

Head $3 \frac{1}{6}$ to $3 \frac{2}{7}$; depth $3 \frac{7}{8}$ to $4 \frac{1}{2}$; D. XXIV or XXV, 12 or 13; A. II, 21 or 22; scales in 71 to 75 rows from origin of lateral line to caudal base, and 3 or 4 more on latter; tubular scales 46 to 48 in lateral line to caudal base and 2 or 3 more on

latter; 8 or 9 scales above lateral line to soft dorsal origin; 15 to 17 scales below lateral line to anal origin; snout $3 \frac{1}{6}$ to 4 in head from upper jaw tip; eye $3 \frac{2}{3}$ to 5; maxillary 2 to $2 \frac{1}{5}$; interorbital 7 to 10; head width $1 \frac{2}{7}$ to $1 \frac{3}{5}$ in its total length. Snout convex, length $\frac{2}{5}$ width at front eye edges. Bands of fine palatine and vomerine teeth; outer jaw teeth strong, uniserial, conic, uniform, with broad inner band of small simple conic teeth in front of each jaw, along inner edge of each lip fine fringe; Nostril with short pointed tentacle $\frac{1}{4}$ of eye; palmate supraorbital tentacle half of eye; median predorsal palmate tentacle little shorter, and each side little posterior, short fringe. Rakers ~~shorter~~ 4+10 short strong lanceolate points, 3 in filaments and latter $1 \frac{3}{4}$ in eye. Scales with 14 to 19 radiating basal striae; circuli moderate. Color in alcohol buster, specked or dotted very finely and onscurely with dark, and in head spots more clear and rather fewer, especially below. Fins paler than body and marked with numerous darker spots, most distinct terminally, though mostly basal on pectoral, Caudal with 4 or 5 somewhat irregular broad dark transverse bands. Length 80 to 120 mm. Two from Valparaiso and one labeled "Fiji" and though the latter locality ~~may be~~ questionable it also accompanies the original drawing.

Structurally Clinus crinitus Jenyns, C. geniguttatus Valenciennes, C. variolosus Valenciennes and C. niger Philippi, all appear very closely related and very likely will be found to represent fewer species.

Lepisoma microcirrhys (Valenciennes). *Fig. 416 and 417.*

Head $3 \frac{1}{10}$ to $3 \frac{2}{5}$; depth $4 \frac{2}{7}$ to $4 \frac{1}{4}$; D. XXIV to XXVI, 11 or 12; A. II, 21 to 23; scales in 100 to 104 rows, 70 in young, along and close above lateral line to caudal base; tubular scales 59 to 62, in young 46, in lateral line to caudal base; 10 or 11 scales above lateral line to soft dorsal origin; 21 or 22 scales below lateral line to anal origin; snout $3 \frac{2}{3}$ to 4 in head from upper jaw tip; eye $4 \frac{1}{6}$ to $7 \frac{2}{3}$; maxillary $2 \frac{1}{10}$ to $2 \frac{1}{2}$; interorbital $9 \frac{1}{8}$ to $11 \frac{1}{4}$; head width $1 \frac{5}{6}$ to $2 \frac{1}{10}$ in total head length. Snout about long as wide, surface convex. Teeth as in L. philippi. Rakers 27 , short, asperous denticles, lanceolate in young; filaments equal eye. Scales cycloid, marginal radiating basal striae 24 or 25; circuli coarse. Color in alcohol warm umber generally, mottled rarker. Body everywhere with very fine deep brown spots or dots, also on fins.

Length 90 to 290 mm. Seven examples without locality, though according to the original drawings four are from Valparaiso and one from Peru. *The drawings are unsigned, 2 without locality and 1 from Valparaiso and 1 Peru.*

Our smallest example shows the supraorbital tentacle about $\frac{2}{5}$ of the eye.

Hypleurochilus geminatus (Wood). *Fig. 418.*

Head $3 \frac{2}{5}$; depth $3 \frac{3}{5}$; D. XII, 15; A. 18; snout 3 in head; eye $3 \frac{1}{6}$; maxillary 3; interorbital 2 in eye; head width $1 \frac{2}{5}$ in its length. Snout convex, rather inclined, length $\frac{3}{4}$ its width measured at front of eye. Eye trifle less than snout, high.

Supraorbital tentacle with fringe of 5 slender points. Maxillary to pupil. Mouth terminally inferior, lower jaw little shorter. Teeth 24 above, 20 below, uniserial, compressed, slender, and canine each side behind, lower of which little longer. Interorbital moderate, concave. Gill-opening about wide as pectoral base. Color in alcohol dull uniform brownish, markings if present in life now faded. Length 45 mm. One without locality, likely from Rio Janeiro?

We have compared the type of Blenniys germinatus Wood, from Charleston, S.C., which is still in the Academy. It has the same number of teeth and much larger and stronger canines.

Blennius (Hypleurochilus) paytensis Steindachner differs in being described without canines. Its size is not given.

H. geminatus has not been recorded from the West Indies or South America.

Hypleurochilus periophthalmoides (Macleay).

Head $3 \frac{1}{2}$; depth $3 \frac{7}{8}$; D. XII, 18; A. II, 18; P. I, 12; snout 4 in head; eye $2 \frac{4}{5}$; maxillary $2 \frac{7}{8}$; interorbital $2 \frac{2}{3}$; head width $1 \frac{1}{2}$. Snout convex, length $\frac{3}{4}$ its width. Maxillary to eye center, and preorbital very narrow. Mouth terminal, lower jaw slightly shorter. Teeth large, simple, slightly compressed, uniserial; pair of wide-set canines in lower jaw. Interorbital convex, broad. Gill-opening small slit, lateral, before pectoral base and about long as width of same. Color in alcohol pale brownish with traces of about transverse deeper or cross-bars,

extending over dorsals and anals, where very contrasted, and last bar across caudal basally. Length 14 to 18 mm. Three from the Sulu Archipelago.

Blennius periophthalmoides Macleay²⁸⁷ appears to agree largely with our specimens, though its size is not given. It differs, however, in that the depth is given as 6 in the total, whereas in our largest specimen it is only 4. The dorsal rays are said to be 16.

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Proc. Linn. Soc. New South Wales, 1883, p. 269. Dufaire, New Guinea.

Hypleurochilus vaillanti Jordan and Seale²⁸⁸ is based on an example only about the size of our smallest. It differs in the broader suborbital, very short gape to mouth, and the soft dorsal and anal more or less joined to the caudal, while in our examples they are quite distinct.

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Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 420, fig. 102. Pago Pago, Samoa.

Blennius pilicornis Cuvier.

Fig. 419.

Head $3 \frac{1}{2}$; depth $3 \frac{3}{4}$; D. XII, 21; A. I, 23; snout 3 in head; eye $4 \frac{3}{4}$; maxillary $2 \frac{2}{5}$; head width $1 \frac{3}{5}$; interorbital 2 in eye. Snout convex, length $\frac{4}{5}$ its width. Maxillary to hind eye edge; expansion $1 \frac{1}{4}$ in eye. Teeth in jaws uniserial, even, compressed or incisor-like, 24 above, 28 below; canine above and below each side, posteriorly. Interorbital convex.

Fringed tentacle above each eye about half its diameter. Rakers 10?, short rudimentary points, greatly less than filaments, which $1 \frac{1}{6}$ in eye. Lateral line to soft dorsal, pores about 23. Color in alcohol dull uniform blackish. Length 135 mm. Rio Janeiro.

This species falls in Parablennius Ribeiro, characterized chiefly by the incomplete lateral line.

Valenciennes gives²⁸⁹ the supraorbital tentacle more than a fourth the head length, upper teeth 26 and lower 24, and head $4 \frac{1}{2}$ in body including caudal. Our example shows head 4 in body with caudal. In size his examples were 128 to 152 mm. long.

Gunther changes the name to Blennius filicornis. His example, an adult, is said to have the head $4 \frac{3}{4}$ and the depth $5 \frac{1}{5}$ in the total length. He mentions the dorsal origin as opposite the preopercle edge and a slight notch between the spinous and rayed portions of the dorsal fins.

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Hist. Nat. Poiss., vol. 11, 1836, p. 187 (254). Rio Janeiro.

Bleinnius galerita Linnaeus. Fig. 420
 Drawing of an example from Madeira,
unsigned.

Salarias alboguttatus Kner Fig. 421.
 Drawing of an example from Fiji,
unsigned.

Salarias maccullochi Fowler and Bean. Fig. 422.

Salarias maccullochi Fowler and Bean,
 Proc. U. S. Nat. Mus., 63, 1923, p. 25.
Bellinghausen Island.

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Salarias marmoratus (Bennett). *Fig. 423 and 424.*

Head $4 \frac{2}{5}$; depth $5 \frac{1}{2}$; D. XIII, 16; A. 17 or 18; snout 3 in head; eye 3 to 4; maxillary $2 \frac{1}{5}$ to $2 \frac{1}{2}$; interorbital $1 \frac{1}{3}$ to $1 \frac{2}{3}$ in eye; head width $1 \frac{3}{4}$ to $1 \frac{4}{5}$ its length. Snout convex, obtuse, length about $\frac{3}{4}$ its width. Eye elevated; no

tentacle. Mouth wide. Lips entire. Teeth fine, movable, even, close-set, slender incisors; pair of small wide-set low canines below. Interorbital narrow, level. Rakers 28?, very weak rudimentary points; filaments equal eye. Pores in lateral line 42?, complete, upper section deflected after sixth dorsal spine. Color in alcohol faded dull or pale brownish, fins paler than body. From pectoral axil longitudinal row of white spots over costal region, 5 at least distinct. Small examples with traces of dark blotch on first 2 membranes of spinous-dorsal medianly. Length 26 to 65 mm. Ten without data, doubtless from the Hawaiian Islands. A drawing of one is labeled "Sandwich Islands".

Salarias geminatus Alleyne and Macleay. *Fig. 425 and 426.*

Head $4 \frac{7}{8}$ to 5; depth $5 \frac{3}{4}$ to $5 \frac{7}{8}$; D. XIII, 20 or 21; A. 23; snout 3 to $3 \frac{3}{4}$ in head from forehead to hind edge of gill-opening; eye $3 \frac{7}{8}$ to $4 \frac{4}{5}$; mouth width 2; interorbital $2 \frac{1}{5}$ to $2 \frac{1}{4}$ in eye; head width $1 \frac{4}{5}$ to $1 \frac{7}{8}$ its length. Snout very obtuse, receding in profile, length $\frac{3}{5}$ to $\frac{3}{4}$ its width. Eye elevated; pointed supraorbital tentacle $\frac{3}{4}$ eye-diameter. Mouth wide. Lips entire. Teeth fine, even, movable, close-set, slender incisors; pair of small wide-set canines below. Interorbital narrow, slightly concave. Rakers ~~4~~ 11, short, weak points, greatly less than filaments, which $1 \frac{1}{2}$ in eye. Lateral line incomplete, pores about 30. Color in alcohol olive-gray, with 9 broad transverse dull brown crossbars. Brown blotch behind eye. Fins pale, deep brownish terminally. Spinous dorsal with deep brown longitudinal band and broad deep brown edge. Soft dorsal with narrow whitish edge and oblique brownish streaks across membranes, finer and more numerous over dark submarginal region. Anal with brown streak on each membrane between and parallel with rays. Pectoral with 5 or 6 brown cross-lines. Length 105 to 138 mm. Two from Fiji.

Our examples agree in most respects with the description and figure by ~~McCulloch and McNeill~~ McCulloch and McNeill²⁹⁰. Quite characteristic is the pale edge of the soft dorsal. Our material does not show so many longitudinal dark bands on the soft dorsal as these writers indicate and the last dorsal ray membrane does not encroach

on the caudal. The oblique dark lines on the soft dorsal are less oblique and the anal membranes differ, as described above. Both our examples show the lower half of the caudal darker than the upper half, whereas McCulloch and McNeil show it terminally entirely dark. The writers' S. geminatus is possibly the male of S. dussumieri, though the figure given by Day is without a pale edge to the soft dorsal, and the same is not indicated in the description. The presence of canines is variable, though both our examples have them.

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Records Austral. Mus., vol. 12, part 2, 1918, p. 20, Pl. 4, fig. 3...

Salarias lineatus Valenciennes . *Fig. 427.*

Head $4 \frac{3}{4}$; depth 5; D. XII, 23; A. 26; snout 3 in head; eye 4; maxillary 3; interorbital 2 in eye. Body slender, strongly compressed. Head width $1 \frac{7}{8}$ its length. Snout obtuse, forehead protruding, length $\frac{3}{5}$ its width. Eye well elevated; pointed supra-orbital tentacle half eye diameter. Mouth broad. Upper lip crenulated marginally, lower lip entire. Teeth fine, movable, even, slender-close-set incisors; no canines. Nostril with fringed flap about half length of supraorbital. Interorbital very narrow, concave. Rakers about $3 + 15?$, short, weak points, $\frac{1}{5}$ of filaments, which $1 \frac{1}{5}$ in eye. Lateral line incomplete, not extending to soft dorsal, and latter joined to caudal. Color in alcohol with back and upper surface somewhat fuscous. Side of body with about 6 dark narrow longitudinal lines, variable, paler or obsolete on costal region. Belly citrine drab

Fins dull brownish. Dorsals with oblique narrow lines, and on soft dorsal crowded as fine oblique lines marginally. Spinous dorsal and anal darker terminally. Length 95 mm. One from Fiji.

Salarias caudolineatus Günther.

Head $4 \frac{2}{5}$; depth $5 \frac{2}{5}$; D. XII, 21; A. 23; eye $3 \frac{1}{6}$ in head; maxillary $2 \frac{1}{8}$; interorbital 2 in eye length; head width $1 \frac{2}{3}$ its length. Snout length about half width of mouth, and forehead protruding in front profile. Eye elevated, with long slenderly acuminate tentacle about $\frac{2}{3}$ of eye. Mouth wide. Lips entire. Teeth very fine, slender, even, close-set incisors; no canines. Nasal flap not evident. Interorbital narrowly concave. Rakers few rudimentary weak short points; dilalements $1 \frac{1}{2}$ in eye. Lateral line incomplete, arch in front not quite extending far as depressed pectoral tip. Color in alcohol dull-olive brown. Trunk with indistinct traces of one or two uneven and somewhat disjointed brown lines above anal. Under surface of head and abdomen paler. Row of pale spots all along lower edge of trunk close to anal base and another, at least partly so, along front base of anal. Fins all pale brown, dorsals with 4 lines or bands longitudinally of dark brown, where not all even and some oblique. Caudal with 5 dark transverse lines. Anal with slightly darker brown terminal edge than general color of fin. Length 65 mm. Fiji.

Günther describes this species on two examples, 51 mm. long, from Tahiti. His figure differs from our example in that it shows but 2 rows of dark spots on the dorsals and the caudal with 7 rows. Our example has the caudal basally quite dark, so that the

3 narrow transverse lines basally on caudal may be observed. It also shows very pale traces of the ninth transverse bars on the trunks as shown by Günther.

Likely Salarias garmani Jordan and Seale²⁹² is the young.

²⁹²

Bull. Bur. Fisher., vol. 25, 1905 (1906), p. 429, fig. 157.

Salarias fasciatus (Bloch). *Fig. 428.*

Head 4 to 4 $\frac{1}{8}$; depth 3 $\frac{2}{5}$ to 4; D. XII, 19 or 20; A. I, 20; snout 3 to 3 $\frac{1}{5}$ in head; eye 3 to 3 $\frac{2}{5}$; maxillary 2 $\frac{3}{5}$ to 3; interorbital 2 to 2 $\frac{1}{5}$ in eye. Body well compressed, moderately deep. Head width 1 $\frac{3}{4}$ to 2 in its length. Snout short, length about $\frac{2}{3}$ its width, forehead protruding in front profile. Eye high; pointed supraorbital tentacle half of eye. Mouth wide. Lips entire. Teeth fine, movable, form close-set edge, ends truncate; canines short, one each side of lower jaw posteriorly. Nasal tentacle about long as supraorbital. Interorbital concave. Rakers 3 + 10?, short, weak points, greatly less than filaments, which $\frac{2}{3}$ of eye. Lateral line incomplete, extends only slightly beyond depressed pectoral. Dorsals very slightly notched. Caudal rounded behind.

Color in alcohol dull brown. Few small whitish spots around eye and on preopercle flange. Two white bands transversely over mandible, and about 4 across belly. Side with 8 broad transverse bands of

deep brown, somewhat in pairs. Side with also many fine deep brown longitudinal lines, variable, about front of spinous dorsal on back broken up into fine dots. Over whole of trunk pattern various pale or whitish spots and dark lines forming reticulations, especially below. Dark bars on trunk extend on vertical fins. Spinous dorsal with pale spots. Soft dorsal with dark oblique narrow lines. Pectoral, ventral and caudal with irregularly transverse brown lines. Length 78 or 79 mm. Two from Fiji.

We have compared Samoan examples in the Academy, which agree in every way.

Salarias rivulatus Rüppell. *Fig. 429 and 430.*

Head 4 to $4 \frac{1}{5}$; depth $4 \frac{1}{2}$ to 5; D. XII, once XIII, 21, once 20; A. 23; snout $2 \frac{3}{4}$ to 3 in head; eye $3 \frac{1}{6}$ to 5; maxillary 2 to $2 \frac{2}{5}$; interorbital $1 \frac{1}{2}$ to $1 \frac{2}{3}$. Body strongly compressed. Head width $1 \frac{5}{6}$ to 2 in its length. Snout convex, length $\frac{3}{4}$ to $\frac{4}{5}$ its width. Eye well elevated; pointed supraorbital tentacle long as eye-diameter. Mouth wide. Lips with edges entire. Teeth fine movable, in lips, even, close-set incisor-like; no canines. Nasal flap with fringe of 5 tentacles. Interorbital narrow, concave. Head with median continuous crest, high as eye-diameter. No nuchal tentacles. Rakers $2+17$, short, weak points, $\frac{1}{5}$ of filaments, which equal eye. Lateral line with $21+17$ pores, extends after deflection half way in dorsal length, though little behind front of dorsal in young. Soft dorsal joined with caudal. Color in alcohol clove-brown generally, little paler or dull olive on belly.

Vertical fins dark, like back. Spinous dorsal with 5 horizontal pale lines, basal as row of spots and subbasal broadest, others narrower towards upper fin edge. Soft dorsal with similar pale inclined lines. Anal dark terminally and with 2 median pale longitudinal lines. Length 69 to 118 mm. Three from Fiji and one from Balabac Passage.

A drawing, representing a young example is labeled Tongatabu, also 2 drawings of Fiji examples.

Salarias fuscus Rüppell. Fig. 431.

Head $3 \frac{1}{2}$; depth 4 to $4 \frac{1}{6}$; D. X or XI, 16 to 18; A. 20 or 21; snout 3 to $3 \frac{1}{5}$ in head; eye $3 \frac{1}{8}$ to $3 \frac{4}{5}$; maxillary $3 \frac{5}{6}$ to $3 \frac{1}{10}$; interorbital 2 to $2 \frac{1}{5}$ in eye; head width $1 \frac{1}{2}$ to 2 in its length. Snout obtuse; convex, forehead receding; length $1 \frac{2}{5}$ to $1 \frac{1}{2}$ its width. Eye elevated; pointed supraorbital tentacle $1 \frac{1}{4}$ in eye. Mouth wide. Upper lip with crenulate edge, lower entire. Teeth fine; movable, even, close-set, slender incisors; no canines below. Interorbital narrow, slightly concave. Rakers ~~3~~ 10?, short, weak points, greatly less than filaments, which $1 \frac{1}{5}$ in eye. Lateral line pores ~~15~~ 21; upper section reaches nearly to soft dorsal. Color in alcohol with back dark neutral gray, paler on belly and abdomen. Fins all neutral brownish and front of spinous dorsal sometimes with blackish blotch. Length 65 to 78 mm. Two from Fiji.

The above agree largely with Philippine examples in the Academy, though the whitish on the upper half of the caudal and the last dorsal rays is scarcely evident, however there is a trace of the dark basal pectoral blotch. The species is not previously known from Fiji.

Salarias holomelas Günther is separated by Jordan and Seale as a Polynesian species with a dark caudal, though we fail to see any value in the alleged yellow caudal of S. fuscus, believing it simply a variation.

Salarias zebra Vaillant and Sauvage. *Fig. 432.*

Head 4 to $4 \frac{2}{5}$; depth $4 \frac{1}{2}$ to 6; D. XIII, 22; A. 21 or 22; snout 3 to $3 \frac{1}{3}$ in head; eye 3; maxillary $2 \frac{1}{4}$; interorbital $2 \frac{1}{2}$ to 3 in eye; head width $1 \frac{2}{5}$ to $1 \frac{7}{8}$ its length. Snout obtuse, front profile vertical, length $\frac{2}{3}$ its width. Eye well elevated; supraorbital tentacle slightly longer than eye-diameter. Lips entire. Teeth fine, movable, even, close-set, slender incisors; no canines. Interorbital very narrow, concave. Rakers ~~4~~ 13, short, lanceolate, about 5 in filaments, which $1 \frac{1}{4}$ in eye. About 23 pores in lateral line, which not extended far as depressed pectoral tip. Color in alcohol dark uniform brown. Outer portions of spinous dorsal dusky or blackish. Length 42 to 71 mm. Three from Maui.

We have compared 3 fine examples of S. edentulus Schneider, recorded from the Hawaiian Islands by Fowler, and a series of this latter species from Samoa, all in the Academy. S. zebra is very close, and differs chiefly in coloration or lacks the dark spots so conspicuous on the trunk posteriorly, dorsal and caudal fins. The record based on the Jones' material in the Academy for the Hawaiian Islands, therefore appears entirely justified and valid.

719.

Salarias viridis Valenciennes.

Figs. 433 and 434.

Head $3 \frac{3}{5}$ to $3 \frac{3}{4}$, or $3 \frac{1}{4}$ to $3 \frac{7}{8}$ in small examples; depth $3 \frac{3}{4}$ to $3 \frac{4}{5}$, or $3 \frac{4}{5}$ to $4 \frac{1}{4}$ in small examples; D. X., seldom XII, 17 or 18; A. I or II, 18 or 19; P. 14 or 15; snout $2 \frac{2}{5}$ to $3 \frac{1}{2}$ in head; eye $6 \frac{2}{3}$ to $7 \frac{2}{5}$, or $3 \frac{1}{2}$ to $4 \frac{2}{5}$ in young; maxillary $2 \frac{2}{3}$ to $2 \frac{4}{5}$, or $2 \frac{1}{4}$ to $2 \frac{1}{2}$ in young; interorbital 6 to $6 \frac{1}{8}$, larger in young; head width $1 \frac{1}{2}$ to $1 \frac{3}{4}$, or 2 in young. Body little more robust in front than behind, where more compressed. Snout short, convexly steep. Eye well elevated; supraoral tentacle 1 to $1 \frac{1}{3}$ eye-diameters. Mouth broad. Edge of upper jaw fringed, and fringe more or less obsolete with age. Teeth fine, movable in lips, firm, close-set edge, each tooth with end mostly truncate; 135 rows of teeth above, 200 in young; 62 rows of teeth below, 100 in young; small short strong canine each side of lower jaw posteriorly. Front nostril with short tentacle. Interorbital slightly convex, with slight median depression. Rakers 1 to 4 14 to 16, rather flexible, lanceolate, 3 in filaments, which $2 \frac{1}{4}$ in snout. Lateral line complete, pores 18 to 20 + 22 to 33. Dorsals with moderate notch, spines all with rather flexible ends. Caudal rounded behind. Color in alcohol deep brown, obscurely mottled darker. Young show faint traces of oblique darker lines on dorsals. Length 42 to 238 mm. Two from Valparaiso, 3 from Callao, 3 from Peru, and 2 without locality, doubtless from Peru? Five drawings, unsigned, 1 Peru, 2 Callao, 2 Valparaiso.

Our examples agree with the original account. The species is well figured and ^{re-}described by Steindachner on 8 examples from Cavancha Bay at Iquique. It is quite likely that the nominal Salarias rubropunctatus Valenciennes is also synonymous, and the figure by Valenciennes²⁹³ is of the young, showing the dorsal without oblique dark streaks. S. gigas Steindachner, which agrees with our smaller specimens, appears to be only a variant. The pale longitudinal band on the head is variable, and nearly uniform examples may, or may not, show the dark blotch of the spinous dorsal forward, or one close behind the eye, one or both being present. S. unicolor Philippi²⁹⁴ and S. modestus Philippi²⁹⁵ are other nominal Chilean species, doubtless closely related, if not identical.

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Regne Am. Cuv. Ed. Ill., Poiss., 1839, Pl. 77, fig. 3.

294

Am. Univ. Chile, vol. 93, 1896, p. 380.

295

L.c., p. 381

Emblemaria atlantica Jordan and Evermann.

Head 3 to 3 $\frac{7}{8}$; depth 4 to 4 $\frac{3}{4}$; D. 28 to 30; A. 22 or 23; snout 3 $\frac{1}{3}$ to 4 $\frac{2}{5}$ in head; eye 3 $\frac{1}{6}$ to 3 $\frac{1}{2}$; maxillary 1 $\frac{7}{8}$ to 2; head width 2; interorbital 1 $\frac{2}{3}$ to 2 in eye. Snout length $\frac{2}{3}$ its width. Eye anterior, little elevated; no tentacle. Maxillary well beyond eye. Teeth strong, conic, simple, in single row in jaws, on vomer and palatines. Interorbital narrow, concave.

Rakers about 7? short rudimentary feeble points, greatly less than filaments, which $1 \frac{2}{3}$ in eye. No lateral line. Dorsal elevated in front, first spine ending filament and long as head. Color in alcohol dull russet, with 8 obscure deeper cross-bars. Spinous dorsal blackish in front, filament whitish. Anal edge dusky and dark blotch on each ventral. Dark transverse bar at caudal base. Length 34 or 35 mm. Rio Janeiro. Two examples.

The original account²⁹⁶ is based on an example 90 mm., apparently differing only as a change with age. E. pandionis Evermann and Marsh is doubtless based on a young example, as it is but 38 mm. long, so that the comparisons given by these authors²⁹⁷ in their key are not satisfactory. Their figure shows longer ventrals than either of our specimens. E. atlantic is not previously known from Brazil.

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Jordan and Evermann, Bull. U.S. Nat. Mus., No. 47, part 3, 1898, p. 2402. Pensacola, Florida.

297

Bull. U.S. Fish Com., vol. 20, part 1, 1900 (1902), p. 318, fig. 104, off Porto Rico.

Cirripectes sebae (Valenciennes).

Head $3 \frac{2}{3}$ to $3 \frac{3}{4}$; depth 4 to $4 \frac{1}{3}$; D. XI, 15; A. II, 15; snout 3 to $3 \frac{1}{3}$ in head; eye $3 \frac{1}{5}$ to $3 \frac{3}{4}$; maxillary $1 \frac{4}{5}$ to 2; head width $1 \frac{7}{8}$ to 2; interorbital $1 \frac{3}{4}$ to 3 in eye. Snout length $\frac{3}{5}$ to $\frac{3}{4}$ its width. Maxillary little beyond eye.

Single row of fine even teeth in each jaw; pair of wide-set canines below. Interorbital narrowly convex. Fringe of even well-developed filaments across predorsal from one opercle to opposite. Rakers 2 8? short weak points, much less than filaments, which equal eye. Dorsal spines long, slender, filamentous, some reaching $3/5$ to caudal base. Color in alcohol dull neutral grayish, marked everywhere with darker or dusky-gray reticulations. Vertical fins mostly dusky-brown, others paler. Length 45 to 58 mm. Fout without locality, probably from the Philippines?

Pholis ornatus (Girard). Fig. 435.
 Drawing of an example from Puget
 Sound, inscribed.

Anoplarchus atropurpureus (Kittlitz). *Fig. 436.*

723

Head $5 \frac{1}{2}$ to $6 \frac{1}{2}$; depth $7 \frac{1}{5}$ to $8 \frac{1}{5}$; D. LIV?; A. 36?; snout $4 \frac{1}{2}$ in head; eye $4 \frac{4}{5}$; maxillary $2 \frac{1}{3}$; interorbital $2 \frac{1}{3}$ to $2 \frac{3}{4}$ in eye; head width $2 \frac{1}{4}$. Snout convex, length about $\frac{3}{4}$ its width. Maxillary slightly extended beyond eye; expansion 2 in eye. Bands of fine teeth in jaws, lower laterals little enlarged; no teeth in mouth roof. Interorbital slightly convex. Rakers 25, short rudimentary points; filaments $1 \frac{7}{8}$ in eye. Body naked at present, with traces of very small crowded scales on posterior half. Color in alcohol uniform brownish. Length 75 to 77 mm. (caudals damaged). Two without locality, likely from Puget Sound.?

Xiphidion mucosum Girard. *Fig. 437*

Head 7 to 8; depth 8 to $8 \frac{3}{4}$; D. LXII to LXXX; A. 48 or 49; snout $4 \frac{1}{4}$ to $5 \frac{3}{5}$ in head from upper jaw tip; eye $5 \frac{3}{4}$ to 7;

maxillary $2 \frac{3}{5}$ to 3; interorbital $6 \frac{4}{5}$ to $7 \frac{2}{3}$; head width 2 to $2 \frac{1}{6}$ in total head length. Snout convex, length $\frac{2}{3}$ its width. Maxillary ~~little~~ beyond eye, shorter in smaller example. Row of strong conic teeth in each jaw; moderate of front canines above and 4 much larger equal ones below. Interorbital convex. Rakers 3+9, lanceolate, $\frac{1}{3}$ or less of filaments, which equal eye. Scales cycloid, with 10 to 12 radiating marginal striae; circuli coarse. Color in alcohol nearly uniform dull bone brown. Length 172 to 243 mm. Two without locality, doubtless Oregon or California?

LYCODIDAE.Austrolychus depressiceps Regan. *Fig. 438.*

Head $5 \frac{1}{4}$ to $5 \frac{1}{3}$; depth $10 \frac{1}{8}$ to 11; head $2 \frac{3}{5}$ to $2 \frac{3}{4}$ to vent; D. 105; A. 68; C. 10; snout $2 \frac{3}{4}$ to 4 in head; eye 8 to 12; maxillary $2 \frac{1}{4}$ to $2 \frac{2}{5}$; interorbital $5 \frac{2}{3}$ to $5 \frac{3}{4}$; head width $1 \frac{1}{2}$ to $1 \frac{4}{5}$. Snout depressed, convex over surface, length $\frac{2}{3}$ to $\frac{3}{4}$ its width. Eye near first $\frac{2}{7}$ in head, center about first third in young. Mouth large, broad, lower jaw included. Teeth strong, conic, in bands in front of jaws, uniserial laterally; vomer with 2 rows of rather large low conic teeth and single row on each palatine. Maxillary slightly behind eye, reaches eye center in young; expansion 1 to $1 \frac{1}{4}$ in eye or broader in young. Interorbital slightly convex. Gill-opening extends downward till level with middle of pectoral base. Color in alcohol, back and upper surface rich warm sepia-brown, paler on belly and more so on under surface of head and mandible. Length 83 to 398 mm. Twenty from Oregon Harbor and 3 labeled Tierra del Fuego.

OPHIDIIDAE.Genypterus blacodes (Schneider).

Head $4 \frac{3}{5}$; depth $6 \frac{1}{3}$; D. 133; A. 110; C. 8; about 200 scales counted along lateral line to caudal base; 15 scales above lateral line to dorsal origin, 47 below to anal origin; 24 predorsal scales to occiput; snout $4 \frac{1}{4}$ on head; eye $5 \frac{4}{5}$; maxillary $2 \frac{1}{5}$; interorbital $7 \frac{1}{6}$; head width $2 \frac{3}{5}$. Snout convex, long as wide. Eye well advanced, center little before first third in head. Maxillary extends little behind eye; expansion $1 \frac{1}{8}$ in eye.

Teeth conic, in bands in jaws, outer row enlarged little in front; bands of fine teeth on vomer and palatines. Interorbital convex. Rakers IV 4, III, clavate, $1 \frac{4}{5}$ i filaments, which $1 \frac{1}{8}$ in eye. Scales cycloid, with 24 to 31 radiating striae; circuli coarse, about 16 to 30. Color in alcohol dull uniform umber-brown. Length 224 mm. Valparaiso.

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BATRACHOIDIDAE.

Porichthys notatus Girard. 729-409.

Head $3 \frac{1}{3}$ to $3 \frac{2}{5}$; depth $4 \frac{3}{4}$ to $6 \frac{1}{4}$; D. II - 38; A. 38;
snout 4 to $4 \frac{1}{8}$ in head from upper jaw tip; eye $5 \frac{1}{2}$ to $7 \frac{3}{4}$;
maxillary $1 \frac{5}{6}$ to 2; interorbital $3 \frac{1}{3}$ to $3 \frac{3}{5}$; head width $1 \frac{2}{5}$

to $1 \frac{1}{2}$ in its total length. Snout broadly depressed or flattened; length $2 \frac{1}{5}$ to 3 in its width at front of eyes. Lower jaw well protruded. Maxillary extends little beyond eye; expansion 2 in eye. Narrow band of curved teeth in each jaw, upper lateral little larger behind, curved inward and slightly forward; pair of large curved canines on vomer; 2 lateral canines behind on each ramus of lower jaw; palatines each with short single row of teeth, of which 3 or 4 enlarged. Interorbital level, though region directly back very slightly concave. Opercle with single strong spine. Rakers $1+12$, III, lanceolate, $1 \frac{3}{4}$ in filaments, which $1 \frac{3}{4}$ in interorbital. System of lateral pores extensive on head; row of pores along bases of soft dorsal and anal.

Color in alcohol dull brown. Dorsal pale brownish, with median and basal obscure longitudinal band, also another broadly marginal. Color pale, ends of rays dark. Side, head below and belly more or less pale. Length 128 to 232 mm. Three with uncertain locality,

doubtless from Puget Sound? *Drawing by Richard of an example from Puget Sound.*

Porichthys porissimus (Valenciennes). *Fig. 410.*

Head $3 \frac{1}{8}$ to $3 \frac{2}{5}$; depth 6 to $6 \frac{1}{4}$; D. II - 35 or 36; A. 30 to 35; snout $4 \frac{1}{6}$ to $4 \frac{1}{3}$ in head from upper jaw tip; eye 7 to 8; maxillary $1 \frac{7}{8}$ to 2; interorbital $3 \frac{1}{2}$ to 4; head width 2 to $2 \frac{1}{3}$ in its total length. Snout depressed, height about $\frac{2}{5}$ its width. Eye advanced, hind edge about first $\frac{2}{5}$ in head length. Mouth wide, lower jaw well protruded. Maxillary extends slightly beyond eye; expansion about equals eye. Single

row of small teeth in jaws, on vomer and palatines, several enlarged along palatines and lower jaw; upper outer teeth very small. Interorbital level. Opercle ends in strong straight spine directed backward. Rakers 1+5, lanceolate, nearly equal filaments which long as eye. Shining pores conspicuous, supero-lateral row wide-set; intero-lateral row close-set, series extending from side of costal region till above hind anal rays or about $3/4$ of anal base; close along anal base row of wider spaced pores each side its entire extent; row of close-set pores along edge of lower lip; row over lower face of mandible, also row extends along each side of throat to branchi-ostegal rays; row from breast each side, within ventrals, behind which joined by another branch above and still another from pectoral base, then extends back along each side of abdomen below; inside area of last loup forward from vent nearly to ventral bases; several short rows of pores on opercle and side of head. Color in alcohol dull brown, whitish below on head and belly. Length 73 to 85 mm. Four from Rio Janeiro.

Caularchus maeandricus (Girard).

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth $4 \frac{1}{2}$ to 5; D. 14 to 16; A. 13 or 14; P. 21 to 23; snout 3 to $3 \frac{1}{8}$ in head; eye $5 \frac{1}{3}$ to $6 \frac{3}{4}$; mouth width 3 to $3 \frac{3}{5}$; interorbital 3; flat; head width $1 \frac{1}{8}$ to $1 \frac{1}{5}$. Row of small conic teeth above, with outer row of 9 entire incisors medianly; 18 teeth below, with 10 median flattened as entire incisors. Skin smooth, tough. Color in alcohol uniform dark brown above, paler below. Length 70 to 75 mm. Two from Puget Sound.

Gobiesox sanguineus (Müller and Troschel).

Head $2 \frac{2}{5}$, to $3 \frac{1}{8}$ in young; depth $4 \frac{1}{4}$ to $6 \frac{1}{2}$; D. 10; A. 8, once 6; P. 24 to 26; snout 3 to $3 \frac{1}{5}$ in head; eye $4 \frac{3}{4}$ to $7 \frac{3}{4}$; mouth width $3 \frac{1}{8}$ to $3 \frac{2}{3}$; interorbital $2 \frac{1}{4}$ to $2 \frac{1}{3}$, flat; head width 1 to $1 \frac{1}{8}$. Teeth as 6-truncate incisors in front of each jaw. Preopercle spine strong. Skin smooth, coriaceous. Color in alcohol faded dull uniform brownish. Some larger examples with traces of old rose or carmine, doubtless general color in life.

Length 89 to 197 mm. Five from Peru, though one with tag which says Valparaiso.

We have compared the large example in the Commercial Museum of Philadelphia, recorded as *G. marmoratus* Jenyns from Valparaiso, bt. Fowler²⁹⁸, and find it to be the present species. It differs from the Wilkes specimens only in minor variations: A. 9; P. 21?; snout $2 \frac{4}{5}$ in head; mouth width $2 \frac{1}{2}$; interorbital 2; color of dry skin brownish, mottled darker and mottlings on fin-rays obsolete; length 321 mm. *G. marmoratus* is said to have D. 13; A. 11 a different dentition and a narrow interorbital.

²⁹⁸

Copeia, No. 34, August 24, 1916, p. 65.

BALISTIDAE.

Balistes niger Park.

Fig. - 324.

Head 3; depth $2 \frac{1}{10}$; D.III - ii, 25; A. ii, 23; P. i, 14; scales 52 from gill-opening to caudal base and 4 more on latter; 30 scales from rictus to gill-opening; 42 scales between spinous dorsal origin and pubic spine; snout $1 \frac{1}{5}$ in head; eye $4 \frac{1}{5}$; interorbital $3 \frac{2}{5}$; head width $1 \frac{9}{10}$; 9 rows of antrorse spines along hind portion of trunk and better developed on caudal peduncle. Color in alcohol largely uniform brown, soft dorsal, anal and pectoral pale brown. Spinous dorsal and caudal largely dusky-brown, latter broadly white marginally behind and narrowly pale along upper

and lower edges. Pale ring around base of brown lip. Length 135 mm. Fiji.

This species is well figured by Day.²⁵⁵

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Fishes of India, part 4, 1878, Pl. 181, fig. 1.

Balistes vidua Richardson. *Fig. 325-*

Head $3 \frac{1}{3}$; depth 2; D. III - iii, 32; A. ii, 28; P. i, 13; scales 73 from gill-opening to caudal base and 6 more on latter; 31 scales between rictus and gill-opening; 52 scales transversely; snout $1 \frac{1}{3}$ in head; eye $5 \frac{1}{6}$; interorbital $2 \frac{3}{4}$; head width $1 \frac{3}{4}$; 15 horizontal weak keels along trunk behind, upper and lower mostly weak and several extending on caudal peduncle medially. Color in alcohol largely mars brown, trunk more or less uniform. Spinous dorsal membrane cinnamon, dusky terminally. Soft dorsal, anal and pectoral pale buff-brown, first two bordered black and caudal peduncle mummy-brown, membranes pale. Length 210 mm. Hawaiian Islands.

Schneider
Balistes bursa Lacépède. *Fig. 326-*

Head 3; depth $2 \frac{1}{10}$; D. III - iii, 25; A. ii, 24; P. i, 13; scales 56 between gill-opening and caudal base and 2 more on latter; 28 scales between rictus and gill-opening; 42 scales transversely; snout $1 \frac{1}{5}$ in head; eye $4 \frac{7}{8}$; interorbital $3 \frac{1}{3}$; head width 2; 2- horizontal keels along trunk, most pronounced behind, and 7 rows extend on caudal peduncle. Color in alcohol largely dull brown, little paler on abdomen. Lips pale brown. White line from rictus to anal origin. Membrane of spinous dorsal

deep brown, with large white blotch on second and third membranes terminally. Pubic spine and ventral flap marginally dusky-brown, also anal base, though former edged with white line. Other fins all pale uniform brown. Length 158 mm. Fiji.

Balistes carolinensis Gmelin.

Pencil sketch of an example 113 mm. long.
Brown or chocolate, mottled with
light blue. Otherwise without data,
though may have been taken at Rio
Janeiro?

Balistes flavimarginatus Rüppell. Fig. 327.
Drawing of an example by J. H. Richard.
No data.

Balistes viridescens Schneider.

Sketch with notes by J. Drayton from
an example 656 inches long taken at
Lebulsea, Fiji, June 1840. Body blue.
Green and blue stripes above and parallel
with upper jaw, cheeks largely yellowish.
Eye red, cornea black. Dorsal fin blackish
green basally, longitudinal median
yellowish green band, then vermilion
submarginal band and fin edge black.
Anal like dorsal. Caudal and adjoining
caudal peduncle blackish, then fin with
band of pale green, submarginal band
of vermilion and hind edge black.
Pectoral dirty yellow, base blackish
green.

Balistapus rectangulus (Schneider).

Fig 328.

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Head $2 \frac{4}{5}$; depth $2 \frac{1}{3}$; D. III, - iii, 20; A. i, 19; P. i, 12; scales 44 between gill-opening and caudal base and 3 more on latter; 26 scales between rictus and gill-opening; 46 scales transversely; snout $1 \frac{1}{10}$ in head; eye $5 \frac{1}{4}$; interorbital $3 \frac{2}{3}$; head width $1 \frac{4}{5}$; 4 rows of horizontal antrorse spines on caudal peduncle.

Color in alcohol pale brownish generally. Interorbital marked by broad deep brown connecting band which extends below eye to include gill-opening, post-branchial scales and pectoral base, then widens out at more inclined angle to include vent and most of anal. In dark interorbital 3 narrower darker connecting lines. From lower front eye edge dark area edged with whitish, also whitish line curves out little forward, then in to pectoral base. Along dark area, from upper end of post-branchial scales, narrow whitish bordering band giving off branch above and just behind depressed pectoral tip, which extends to last soft dorsal rays. Caudal peduncle blackish-brown, with long forward wedge marginal whitish and extending in area marked by white bands described extending from gill-opening, also hind edge with white border. Spinous dorsal membrane blackish-brown, all other fins pale brown. Basal edge of upper lip with narrow pale line. Length 171 mm. Pomoton.

Sketch of an example 455 mm. long from Ranaia Island; color sketch by Drayton without locality, from September 6, 1839; color sketch by W. M. Walker from example from Carlshoff Island; drawing by J. H. Richard of example from Pomoton.

Balistapus aculeatus (Linnaeus).

Fig. 329.

Head $2 \frac{2}{3}$ to $2 \frac{7}{8}$; depth $2 \frac{1}{4}$ to $2 \frac{2}{5}$; D. ii or iii, 21 to 23; A. ii, 19 or 20; scales 40 to 43 from upper end of gill-opening to caudal base and 2 or 3 more on latter; 26 to 30 scales between rictus and gill-opening; 32 to 40 scales transversely from spinous dorsal origin to pubic spine; eye $5 \frac{1}{8}$ to $5 \frac{1}{2}$ in head; interorbital $3 \frac{2}{5}$ to $4 \frac{1}{8}$; head width $1 \frac{4}{5}$ to 2.

Color in alcohol brownish generally. Four whitish bands across interorbital, 2 median wider and define 3 narrow deep brown lines. Outer pale line from above extends down to front of pectoral base, also third runs from lower front eye edge. Obscure deep brown band from mouth angle to lower pectoral base, margined below with whitish line, which variably distinct. Narrow whitish or pale blue line crosses upper lip basally. Three rows of retrorse spines, dark brown basally, along side of caudal peduncle, outer edges of patch broadly whitish. Whitish line from large scales behind gill-opening to vent, followed by deep brown band 2 or 3 scales wide, then 2 close-set white parallel bands, also broader dark band 2 scales wide, and finally another pair of white close-set bands though last little more separated. Vent dusky. Fins all dull brown. Dusky vertical bar before pectoral base. Length 138 to 173 mm. Two from Fiji, one from Samoa, one labeled "Pacific" and another without locality, doubtless from Polynesia?

Painting of an example from Koroisoff Island, September 13, 1839, by J. Drayton. Also the following drawings by Richard, 2 Fiji, 2 no date, 1 Samoa.

Balistapus undulatus (Parks). ⁴/₂ 330

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Two drawings by Richard, one labeled
Boston which may pertain to Boston
Island?, the other without locality.

Buniva (Lucifera). Fig. - 332.
Melichthys radula (Richardson).

Head $3 \frac{2}{5}$ to $3 \frac{4}{5}$; depth $2 \frac{1}{10}$ to $2 \frac{1}{3}$; D. III -11, 30 or 31; A. 11, 27 or 28; P. 1, 14; scales 60 to 63 from gill-opening to caudal base and 5 more on latter; 22 scales from rictus to pectoral origin; 44 or 45 scales from spinous dorsal origin to pubic spine; snout $1 \frac{1}{3}$ to $1 \frac{1}{2}$ in total head length; eye $4 \frac{2}{5}$ to $4 \frac{4}{5}$; interorbital $2 \frac{1}{3}$ to $2 \frac{1}{2}$; head width $1 \frac{4}{5}$ to $1 \frac{7}{8}$; 9 or 10 horizontal keels below soft dorsal and anal, extending on caudal peduncle. Color in alcohol largely fuscous, uniform on head and fins, except narrow white line along bases of dorsal and anal. Smallest example with 7 or 8 longitudinal dark lines on soft dorsal and anal, more obsolete terminally, and all absent from larger example. Length 173 to 235 mm. Two from Pomoton.

Fowler retains the Atlantic form as distinct²⁵⁶. Our examples do not differ from either Ascension Island or Jamaica examples.²⁵⁷

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Proc. U.S. Nat. Mus., vol. 56, 1919, p. 225.

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Proc. Acad. Nat. Sci. Phila., 1919, p. 148

Two drawings by Richard of examples without data. Two sketches by Drayton, with notes, of examples from Clermont de Tonner Island, August 1839.

MONACANTHIDAE.

Cantherines sandwichiensis (Quoy and Gaimard). *Fig. 333.*

Head $3 \frac{1}{3}$; depth 2; D. II-37; A. 32; P. i, 14; eye $4 \frac{1}{2}$ in head; interorbital $2 \frac{7}{8}$; head width $1 \frac{7}{8}$. Eye $1 \frac{7}{8}$ in gill-opening, which extends forward nearly whole length of eye. Body rough velvety. Caudal peduncle with 2 pairs of strong short antrorse spines. Dorsal spine with front surface finely asperous, no denticles on edges; its insertion over front half of eye, $1 \frac{1}{6}$ in head. Color in alcohol uniform mummy-brown. Teeth white. Length 234 mm. Tahiti.

Compared with smaller Hawaiian examples, in the Academy, we find the dorsal and anal very pale in the latter, also pectoral variably pale, and some have caudal end whitish.

Monacanthus chinensis (Osbeck). *Fig. 334.*
~~Monacanthus megalourus Richardson.~~

Head $3 \frac{3}{4}$; depth $1 \frac{2}{5}$; D. I-32; A. 32; P. 13; snout $1 \frac{1}{10}$ in head; eye $3 \frac{3}{4}$; interorbital $3 \frac{1}{3}$; head width $2 \frac{1}{4}$. Long ventral flap long as head, measured to upper end of gill-opening. Body with asperous spindles, fine on head. Caudal peduncle with 2 rows of antrorse spines, upper row of 4 and lower of 3. Dorsal spine with row of spines only along each hind edge laterally and spines decurved. Color in alcohol vandyke-brown above and generally with larger irregular paler areas. Two dusky-brown blotches along bases of soft dorsal and anal, and latter with fine waved longitudinal

lines of deep brown. Caudal deep brown, with 3 broad ill-defined deeper bands, median little nearer submarginal.

Length 233 mm. Sydney,

Monacanthus megalourus Richardson, we have not consulted.²⁵⁸
 Gunther's account²⁵⁹ however, agrees in the main. M. chinensis
 Richardson²⁶⁰ is said to have 6 and sometimes more larger
 spines disposed in 2 rows, on each side of the tail which is
 also studded with small ones. The figure shows 3 spines above
 and 4 below, and the ventral flap is greatly shorter than in
 our examples, doubtless a condition of youth.

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con. Pisc., 1843, p. 5, Pl. 1, fig. 3.

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Cut. Fish. Brit. Mus., vol. 8, 1870, p. 237.

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Voy. Erebus and Terror, Ich., 1845, p. 64, Pl. 4, figs. 3-4.

Monacanthus ciliatus (Mitchill). 724. 335.

Head $3 \frac{1}{5}$; depth $1 \frac{1}{2}$; D. II - 32; A. 32; P. 15; snout
 $1 \frac{1}{5}$ in head; eye $2 \frac{3}{5}$; interorbital $2 \frac{3}{4}$; head width 2.
 Gill-opening $1 \frac{1}{2}$ in eye. Skin velvety and spines on cau-
 dal peduncle. Dorsal spine inserted behind eye edge, row of
 moderately strong spines along each hind edge, curved downward.
 Moderate flap, but not extending beyond; spine small and with
 few spinules. Color in alcohol faded dull brown, with obscure

darker markings. Fins all dull brown. Length 58 mm. One without locality, probably from Rio Janeiro.

Compared with examples in the Academy from Florida, and in agreement.

Monacanthus melanocephalus Bleeker. *Fig. 336.*

Head $3 \frac{1}{8}$; depth $1 \frac{1}{2}$; D. II - 26; A. 26; P. 12; snout $1 \frac{2}{5}$ in head; eye $2 \frac{2}{5}$; interorbital $2 \frac{2}{3}$; head width $1 \frac{7}{8}$. Gill-opening $1 \frac{1}{2}$ in eye. Skin velvety and no spines on caudal peduncle. Dorsal spine inserted about over middle of eye, and each hind edge with row of long strong pointed spines, curved downward. Moderate flap behind, ventral spine, though not extending beyond; spine long; strong and with large spinules. Color in alcohol blackish-brown, little clouded. Sides of abdomen pale. Fins all pale brown, and 2 dusky blotches along bases of soft dorsal and anal. Caudal with large dark blotch above and another below, about midway in fin length, also submarginal dark line behind. Length 48 mm. One without locality, likely Polynesia?

This species is easily known by its strong armature of the dorsal and ventral spines.

Monacanthus hispidus (Linnaeus). *Fig. 337.*

Head $3 \frac{1}{10}$ to $3 \frac{1}{5}$; depth $1 \frac{1}{2}$ to $1 \frac{3}{4}$; D. II-32 or 33; A. 32; P. 13 or 14; snout $1 \frac{1}{3}$ in head; eye $2 \frac{3}{5}$ to $3 \frac{1}{8}$; interorbital $2 \frac{4}{5}$ to 3; head width $1 \frac{7}{8}$ to 2. Gill-opening $1 \frac{1}{2}$ to $1 \frac{3}{5}$ in eye. No ventral flap. Skin velvety, and no

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spines on caudal peduncle. Dorsal spine inserted over or close behind eye edge, fully asperous, and with row of decurved strong spines along each hind edge. Color in alcohol dull brownish, mostly uniform, or with few darker or nebulous areas. Often several ill-defined dark blotches along bases of soft dorsal and anal. Length 59 to 86 mm. Rio Janeiro. Two examples.

Monacanthus ayraudi (Quoy and Gaimard). *Fig. 338.*

Head $3 \frac{1}{2}$; depth $2 \frac{5}{6}$; D.II - 32; A. 32; P. 12?; snout $1 \frac{1}{4}$ in head; eye $2 \frac{2}{3}$; interorbital $3 \frac{1}{3}$; head width $2 \frac{1}{4}$. Snout profile slightly convex. Gill-opening below last half of eye; $1 \frac{1}{3}$ in eye/ Dorsal spine inserted over hind eye edge, $1 \frac{1}{3}$ in snout. Row of strong antrorse spines along each side deflected downward and outward. Color in alcohol with back brown, also head above. Belly and lower surface of head, also iris, whitish. Fins all pale brown/ Length 87 mm. One from Sydney?

Monacanthus *trachylepis* Grünther. *Fig. 339.*
~~rudis Richardson.~~

Head $3 \frac{9}{10}$; depth $2 \frac{2}{5}$; D. I - 38; A. 35; P. 1, 12; eye 4 in head; interorbital $3 \frac{1}{5}$; head width 2. Upper profile of head concave from snout tip to spinous dorsal origin. Gill-opening behind and below hind eye edge, little longer than eye. Skin roughly asperous. Dorsal spine finely asperous, with row of small antrorse spines along each hind edge; fin origin over front half of eye. Color in alcohol dull uniform dresden-brown everywhere. Length 265 mm. Sydney.

Richardson's figure shows a shorter dorsal spine than our example, in which it is as long as snout without teeth and lips, besides being inserted anterior. He also indicates a much longer and more slender caudal peduncle, less roughly asperous body and caudal broadly bordered with darker behind.

Monacanthus spilosomus Bennett. *Fig. 340.*

Head $2 \frac{7}{8}$ to $3 \frac{1}{5}$; depth $2 \frac{1}{10}$; D. II - 28 to 40; A. 34 to 37; P. 16; snout $1 \frac{1}{4}$ in head; eye 3; interorbital 3 to $3 \frac{1}{4}$; head width $2 \frac{1}{8}$ to $2 \frac{1}{5}$. Gill-opening $1 \frac{1}{8}$ in eye. Skin rough velvety. No spines on caudal peduncle. Dorsal spine inserted over hind half of eye, and 6 or 7 strong decurved spines along each outer edge, arranged alternately. Flap behind long spiniferous movable ventral spine little developed.

Color in alcohol brownish, trunk with many deep rounded mummy-brown spots. Above pectoral and before anal many spots fused or arranged as longitudinal streaks. Head unmarked, except 4 to 6 narrow dark brown oblique lines inclined toward pectoral. Above ventral spine and submarginally along ventral flap, broad deep brown band, itself bordered and specked with blackish. Soft dorsal and anal pale brown, with 8 longitudinal slightly waved dull brown lines. Spinous dorsal membrane whitish and few dark spots basally. Caudal with whitish membranous, rays pale brown and all except broad blackish-brown

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submarginal band behind finely streaked or barred vertically with deep brown waved lines, also hind caudal edge whitish. Pectoral pale brown. Length 63 to 77 mm. Three from the Hawaiian Islands.

Alutera scripta (Desbeek). Fig. 341.

Drawing of an example from H. mōlū,
 Oahu, July J. H. Richard. A color sketch
 of an example from H. mōlū, November
 1840, by Drayton gives general color
 variegated dark brown and sage green,
 otherwise gall stone with whitish mottling.
 Pale spots, bars or lines blue. Eyes
 gold in yellow, cornea indigo. I in gall
 stone, pectoral lighter.

OSTRACIIDAE.Ostracion cornutus Linnaeus.

Fig. 342.

Head $3 \frac{2}{5}$ to $3 \frac{3}{4}$; depth $2 \frac{2}{3}$ to $2 \frac{3}{4}$; D. 1, 8; A. 1, 8; P. 1, 9; snout $1 \frac{1}{4}$ in head; eye $2 \frac{1}{2}$ to $2 \frac{7}{8}$; interorbital $1 \frac{1}{4}$, deeply concave. Pair of long preocular spines forward, another pair from hind end of lateral ventral keel. Slight spine at middle of back, with another opposite on each upper lateral keel. Caudal long, slender, $1 \frac{1}{2}$ to 2 in combined head and trunk. Color in alcohol dull cinnamon-brown generally. Fins all dull uniform brown. Carapace marked with moderate well-spaced pale spots on sides, smaller and more crowded on upper surface. Length 144 to 158 mm. One from

Tahiti and another from Fiji. *Three drawings by Richard, all without locality.*

Ostracion formosini Bianconi

Fig. 343.

Head 3 to $3 \frac{2}{5}$; depth $2 \frac{2}{5}$ to $2 \frac{1}{2}$; greatest width of carapace $2 \frac{1}{10}$; D. 1, 8 or 9; A. 1, 8; P. 1, 8; snout $1 \frac{2}{5}$ to $1 \frac{1}{3}$ in head; eye 2; interorbital $1 \frac{3}{4}$ to $1 \frac{4}{5}$, deeply concave. Pair of strong, slender preocular spines, nearly long as eye. Strongly compressed median spine on back, curved backward. Ventral ridge ends in strong slender spine,

long as preocular, opposite vent. Bony bridge behind dorsal with 3 transverse rows of scales. Color in alcohol dull brownish, sides and above with scattered white spots. Length 38 to 64 mm. One from the Hawaiian Island, and 3 others from the same place.

The above quite agree with Lactoria galeodon Jenkins, which is synonymous with the present species according to Günther.

Ostracion diaphanus Schneider: Fig. 344.

Head $4 \frac{1}{4}$; depth $3 \frac{1}{8}$; greatest carapace width 3; D. i, 8; A. i, 8; P. i, 9; head width equals its length; snout $1 \frac{1}{6}$; eye $4 \frac{4}{5}$; interorbital $1 \frac{3}{5}$; deeply concave. Pair of short conic preocular spines. Compressed smaller triangular spine at middle of back and opposite on upper lateral ridge of back small or rudimentary low knob. Ventral ridge ends in strong wide spine each side opposite vent. Bony bridge behind dorsal fin with 4 transverse rows of scales. Color in alcohol generally wood-brown, largely uniform. Tail, dorsal, anal and caudal fins dull brown, latter dusky. Length 314 mm. Hawaiian Islands.

Lactoria schlemmeri Jordan and Snyder and Ostracion dexter Seale, are very evidently this species, in the synonymy of which they are placed by Günther.

Ostracion sebae Bleeker. *Fig. 345.*

Head 3; depth $2 \frac{3}{4}$; carapace width $2 \frac{1}{2}$; D. 1, 9; A. 1, 8; P. 1, 10; eye $2 \frac{1}{3}$ in head; interorbital 1, very slightly concave. Carapace without any spines. Bony bridge behind dorsal with 3 transverse rows of scales. Color in alcohol clove brown generally. Carapace only on its upper surface and upper surface of caudal peduncle, with small and moderately numerous white spots, none on fins. Sides of carapace finely spotted with deep brown, larger on caudal peduncle side, and all with pale reticulating lines. Head largely dull uniform brownish, jaws paler. Fins dull brown, caudal basally and marginally clouded or spotted with darker. Length 108 mm.

Hawaiian Islands. *Three drawings by Richard, all without locality.*

Jordan and Evermann give as a distinction for this species²⁶¹ "anterior opening of the carapace broad, greater than orbit". In our specimens of O. sebae the width of the coriaceous buccal area equals the eye-diameter, though its length is half an eye-diameter longer. For O. lentiginosum they contrast "anterior opening of carapace narrow, its width less than orbit". In our examples of this latter species the aperture in question is equally wide as the eye, only narrower in young examples. It is therefore quite evident that this feature is a largely variable and unreliable character for distinction. The slightly convex profile and uniform color pattern of the sides and lower surface, will serve easily to distinguish O. sebae.

²⁶¹. Their O. oahuensis a synonym of O. sebae

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A painting by J. Drayton, labeled Labulsea, Fiji, May 1840, says native name "dabel". Generally neutral slate with tints of heliotrope purple. Cheek and interorbital sage green, also outer half of caudal. Jaw dusky and malachite green. Iris and sides of trunk with ochraceous spots, on caudal peduncle spots orange ochraceous. Dorsal olive buff with pale neutral mottling. Caudal neutral slate basally. Anal transparent, rays brownish. Pectoral uniform sage green. Back generally like sides, or little more black or dull, thickly marked with small white spots. Under surface of carapace shown as uniform dusky neutral.

punctatus
Ostracion lentiginosus Schneider. *Fig. 346.*

Head $3 \frac{1}{5}$ to $4 \frac{1}{4}$; depth $2 \frac{1}{2}$ to $3 \frac{1}{4}$; D. 1, 8;
 A. 1, 8; P. 1, 9; eye $2 \frac{1}{5}$ to $2 \frac{7}{8}$ in head; interorbital
 1 to $1 \frac{1}{5}$, very slightly concave. Carapace 4 ridged, with-
 out any spines. Body bridge behind dorsal with 3 transverse
 rows of scales. Color in alcohol fuscous or dark brown, spot-
 ted everywhere, except on dorsal, anal and pectoral, with fine
 or small white dots, less numerous and larger in young. In
 larger examples spots larger on sides of caudal peduncle and
 carapace below about ventral. Length 67 to 140 mm. Two from
 Fiji and one Hawaiian. *Two drawings by Richard,
 both without locality.*

TETRODONTIDAE.

Spheroides spengleri (Bloch). *Fig. 347.*

Head $2 \frac{4}{5}$; depth 4; D. 11, 6; A. 11, 5; snout 2 in head; eye $4 \frac{1}{8}$ to $4 \frac{7}{8}$; interorbital (bony) $6 \frac{1}{5}$ to $7 \frac{1}{2}$, concave; head width $1 \frac{2}{5}$ to $1 \frac{1}{2}$. Predorsal, occiput and belly prickly, sides and rest of head and trunk smooth. Color in alcohol faded dull brown, marbled paler and darker above, lower surface whitish. Row of about 12 blackish blotches along side below, from chin to pectoral base and thence to lower surface of caudal peduncle. Length 90 to 125 mm. Two from Rio Janeiro.

These agree in every way with West Indian specimens in the Academy.

Spheroides hypsologeneion (Bleeker). *Fig. 348.*

Head $2 \frac{3}{4}$; depth $3 \frac{3}{5}$ to 4; D. 11, 7 or 8; A. 11, 5; P. 1, 14 or 15; snout $2 \frac{1}{8}$ to $2 \frac{1}{4}$ in head; eye $3 \frac{3}{4}$ to 4; bony interorbital $4 \frac{3}{4}$ to $5 \frac{1}{2}$, concave; head width $1 \frac{1}{3}$ to $1 \frac{2}{5}$. Interorbital, front predorsal and abdomen with rather strong or coarse spines, rest of body largely smooth. Color in alcohol brown above, mottled or obscurely spotted with paler. Dusky-brown band from shoulder to base of upper caudal lobe, bordered all along below with equally wide yellowish band. Flanks behind pectoral base speckled with brownish. Under surface of body whitish. Fins dull brownish. Caudal rays and front dorsal rays spotted finely with dull brownish. Length

110 to 134 mm. One from Hawaiian Islands. Two without locality, probably Hawaiian?

We have compared the above with the types of Tetraodon florealis Cope and the latter synonymous as suggested by Gunther. With its somewhat falcate dorsal and anal, and keel along the lower side of the caudal peduncle, this species falls with Lagocephalus.

Spheroides hamiltoni (Richardson).

Head $2 \frac{4}{5}$; depth 4 to $4 \frac{1}{5}$; D. iii, 7; A. ii, 5; P. i, 13; snout $2 \frac{2}{5}$ to 3 in head; eye $4 \frac{1}{8}$ to $4 \frac{4}{5}$; interorbital $4 \frac{3}{4}$ to $4 \frac{4}{5}$; head width $1 \frac{1}{4}$. Interorbital, occiput, front predorsal and abdomen prickly, rest of body and upper surface mouse-gray, thickly spotted with deep mouse-gray, and smaller spots in interorbital. Darker dark blotches form boundaries along upper portion of side. Fins like general color of back. Lower surface of body whitish. Length 88 to 115 mm. Two from Sydney, and doubtless a third, which erroneously(?) labeled "Sandwich Islands".

Our material agrees with Richardson's figure of Tetrodon hamiltoni.²⁶²

Sphaeroides scleratus (Gmelin). Fig. 349.

Sketch by Drayton of an example from
 Tindlerwood Bay, Fiji, July 16, 1840.

Back and upper part of head green,
 marked with small blackish close set
 spots. Broad gray band from lips to
 pectoral base, then along side to caudal
 peduncle medially, bounded below by
 pale pink streak. Under surface of
 head, belly and tail whitish. Iris
 white, with brown ring around black
 pupil and some blue-gray. Purple
 gray blotch before eye and along upper
 caudal edge. Dorsal and caudal greenish,
 former basally and latter medially
 with yellowish. Pectoral base grayish,
 fin white and upper part of fin
 with yellowish green. Anal whitish.

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Spheroides marmoratus (Rauzani). *Figs. 350.*

Head $2 \frac{1}{2}$ to $2 \frac{7}{8}$; depth $3 \frac{1}{5}$ to $3 \frac{1}{4}$; D. 11, 6; A. 1, 5 or 4?; snout $1 \frac{7}{8}$ to $2 \frac{1}{3}$ in head; eye 4; bony interorbital 8, concave; head width $1 \frac{2}{3}$. Body finely prickly, except muzzle, trunk opposite dorsal and anal, and caudal peduncle; prickles above extend from dorsal to front eye edge, below from chin to vent and along lower sides of head; few small inconspicuous prickles behind pectoral, not in axil. Color in alcohol faded dull brownish to dark slaty, paler specimen little lighter below. Length 34 to 95 mm. One labeled "Oahu", evidently by error, and another without locality. Doubtless both obtained at Rio Janeiro.

Compared with West Indian examples in the Academy and agrees in structural characters. With age the species shows a much smaller eye.

Tetrodon hispidus Linnaeus. *Figs. 351 and 352.*

Head $2 \frac{1}{2}$ to $2 \frac{3}{4}$; depth (collapsed) about $2 \frac{3}{5}$ to $2 \frac{3}{4}$; D. 1, 9; A. 1, 9; P. 1, 16; head width $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in its length; snout $1 \frac{3}{4}$ to $1 \frac{7}{8}$; eye $5 \frac{1}{4}$ to 6; interorbital $2 \frac{2}{5}$ to $2 \frac{2}{3}$, concave. Body variably smooth to more or less rough over more or less of inflatable belly. Color in alcohol olive-brown on back to dull drab on belly and lower surface. Blackish around gill-opening and pectoral base. Upper surface of head and trunk with scattered small white spots, some on caudal basally and all smaller than pupil. Fins, except noted, uniform dull brown like back. In smaller example dark lines on sides and below pectoral distinct.

Sketch by Drayton of an example taken at
Yaruker's Island, near the line in V. Lat. and
W. Long. 175°, August 19, 1840. Also 2 drawings
by Richard. 755-

Axilla and base of fin well blackened. Length 178 to 240 mm. One from Fiji and another from the Hawaiian Islands.

We have compared Hawaiian examples in the Academy and find all our material in agreement. An example in the Commercial Museum of Philadelphia, from Pinta Arenas in Costa Rica, is 254 mm. long. Color in alcohol pale or whitish and a very few wide scattered and variably darker spots persisting. When fresh its color doubtless with darker reticulations.

Tetrodon nigropunctatus Schneider

Head $2 \frac{3}{5}$ to $2 \frac{2}{3}$; depth (collapsed) about $2 \frac{1}{8}$ to $2 \frac{2}{5}$; D. 1, 9; A. 1, 10; P. 1, 17; head width $1 \frac{2}{5}$ to $1 \frac{3}{5}$ in its length; snout $1 \frac{4}{5}$ to $2 \frac{1}{4}$; eye 5 to 6; interorbital $2 \frac{7}{8}$, slightly concave. Most of body finely roughened, prickles stronger in larger example and especially numerous over inflatable abdomen. Color in alcohol largely dull brown, more or less uniform generally. Body with several small blackish-brown scattered spots, more numerous and variable in smaller example, some extending even half on back. Fins dull brown. Length 70 to 148 mm. One from Fiji and one from Oahu.

Tetrodon immaculatus (Schneider). Fig 4. 353 and 354.

Head $3 \frac{1}{4}$; depth $2 \frac{3}{4}$; D. 1, 8; A. 1, 8; P. ii, 14; snout 2 in head; eye 6; interorbital 2; level; head width $1 \frac{1}{4}$. Abdomen, most of hind part of head and back, with

rather strong short prickles. Caudal peduncle largely smooth. Color in alcohol dull hair-brown, fading pale below. About 20 narrow darker longitudinal lines, those on back closer, oblique on cheeks. Fins all dull uniform brown. Length 319 mm. Tongatabu. *Sketch by Drayton of*

An example from Tongatabu, May 1840.

The above agrees with a Samoan example in the Academy, except the latter much rougher or with spines a little longer. In the same collection we also compared a Sumatran example 232 mm. long. When freshly received in arrack it was blackish-brown above, deep along edges and hind margin of caudal. Lower surface soiled or dirty brown. Dorsal, anal and pectoral dusky. Lips cream-white. Iris dull slaty. Peritoneum whitish, with minute brownish dots.

Tetrodon meleagris Lacépède. *Fag. 355.*

Head $2 \frac{3}{4}$ to $2 \frac{4}{5}$; depth (when collapsed) about $2 \frac{2}{5}$ to $2 \frac{4}{5}$; D. 1, 8 or 9; A. 1, 9 to 11; P. 1, 17; snout $1 \frac{7}{8}$ to $2 \frac{1}{10}$ in head; eye 6 to 7; interorbital 2 to $2 \frac{1}{4}$; level; head width 1 to $2 \frac{1}{4}$. Body and fins finely prickly most everywhere, except smooth caudal peduncle. Color in alcohol nearly brussels brown, marked everywhere with small pale to whitish round spots, mostly smaller than pupil, and smaller on back. On fins spots extend to caudal edge, though borders of dorsal and anal narrowly brown, that of anal narrowly brown, that of pectoral broadly so. Length 128 to 225 mm. Two from Oahu, and another without definite locality likely from Polynesia.

We have compared the type of Arothron ophrys Cope, in the Academy, and feel convinced it is the adult.

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Painting of an example, by Drayton,
taken at Karlesorff Island, September
3, 1839. Sketch by A. J. Agate, without
locality, September 6, 1839. Also drawing
of adult and one of young, without
locality, by Richard. J.

margaritatus Rüppell. Fig. 356.
Canthigaster amboinensis (Bleeker).

Head $2 \frac{2}{3}$; depth $2 \frac{1}{8}$; D. ii, 9 or 10; A. ii, 8 to 10; P. i, 13 or 14; snout $1 \frac{1}{2}$ to $2 \frac{1}{5}$ in head; eye $2 \frac{7}{8}$ to $3 \frac{3}{4}$; interorbital 3 to 4, slightly concave; head width $1 \frac{3}{5}$ to 2. Head, most of predorsal and abdomen, finely prickly, rest of body smooth. Color in alcohol dark brown generally. Many pale lines, bluish or gray, radiate from eye. Cheek with dark round spots, close-set, and below oblique dark lines forward. Pits on abdomen each deep brown. Trunk and caudal peduncle with rather wide-set pale bluish dots. Fins pale uniform brownish. Bases of dorsal and caudal contrasted deep brown. In young examples body pale, mostly with white spots, above and on sides. Caudal pale brown, with 6 transverse brown bands. Length 33 to 77 mm.

Five from Fiji.

Painting of an example from Tutuila, October 17, 1839, by Drayton. Also 4 drawings, without locality, by Richard. All show the caudal fin spotted.

Canthigaster amboinensis (Bleeker). Fig. 357.
 Figure of an example, without locality, by Richard. Likely from Hawaiian Islands?

DIODONTIDAE.

Diodon holacanthus Linnaeus. *Figs. 358 and 359.*

Head $2 \frac{3}{4}$ to $2 \frac{7}{8}$; depth (collapsed) $2 \frac{1}{2}$ to $2 \frac{3}{4}$; greatest body width about $2 \frac{1}{4}$ to $2 \frac{2}{5}$; D. ii or iii, 12 to 15; A. i, or ii, 13 or 14; P. i, 20; snout $2 \frac{2}{3}$ to $2 \frac{3}{4}$ in head; eye $4 \frac{1}{4}$ to $4 \frac{4}{5}$; bony interorbital $1 \frac{2}{3}$ to $2 \frac{1}{8}$, slightly concave in smaller example, slightly convex in larger; post-pectoral spines 1 to $1 \frac{1}{4}$ in frontal spines, eye $1 \frac{1}{2}$ to 2. Color in alcohol pale brownish, smaller example darker above, and both with upper surface marked with small dusky-brown to blackish spots; which larger and more contrasted along sides of smaller. Larger with fewer and smaller spots. Fins all uniform pale brownish. Under body surface uniform whitish. Iris dull yellowish. Length 105 to 150 mm. One from Oahu and one from Tahiti. *Four drawings by Richard, without locality.*

In comparison with examples of D. hystrix in the Academy from Panama and Bahamas, the latter slightly larger, we find the American material shows shorter prefrontal spines, which about equal postpectoral spines. They also have large dark blotches, dusky brown, on head and back above. In the larger example the spots on the back are larger than in the Polynesian examples, and though it has an immaculate abdomen the Panama specimens have the abdomen covered with small dark spots. They show the interorbital variably level to slightly concave.

All the specimens also show a dark bar, or traces of it, from the lower eye edge.

Chilonycterus spinosus (Linnaeus). *Fig - 360.*

Head $2 \frac{7}{8}$; depth $2 \frac{2}{5}$; body width $2 \frac{2}{5}$; D. 1, 9?; A. 1, 10; P. 1, 21; snout $2 \frac{3}{5}$ in head; eye 4; mouth width $2 \frac{1}{2}$; interorbital $1 \frac{1}{2}$; gill-opening $4 \frac{3}{4}$. Simple individual nasal tentacle. Interorbital broadly concave. Spines all 3 rooted, pair of supraoculars, and supercilliary edge not especially elevated. Median spine at front of interorbital. Color in alcohol uniform dark brownish, at present without any trace of markings. Length 185 mm. (caudal damaged). One example without locality, probably Rio Janeiro?

As the above example is in very poor preservation, and shows no color pattern, its comparison with C. geometricus (Walbaum) from New Jersey and C. antennatus (Cuvier) from Colon, reveal no structural differences.

ANTENNARIIDAE.

Antennarius commersonii (Lacépède).

Two young, 31 to 33 mm. long. Maui. Color in alcohol generally pale, marked with rather large dark blotches. Fins also blotched. Skin fairly smooth and prickles very minute.